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SEASON'S GREETINGS

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION wishes all of its readers joy and happiness for Christmas and for the New Year.

OUR 25TH ANNIVERSARY

This issue starts the 25th year of service which INDUSTRIAL ARTS AND VOCATIONAL EDUCATION has had the privilege of rendering to the teachers, supervisors, directors, and others interested in the fields of industrial arts and vocational education. We hope that our readers will find much that is worth while in the articles specially written for this issue by Edward J. Lake, Head, Department of Art, University of Illinois, Urbana, Ill., one of the four editors who started the magazine; Dr. Homer J. Smith, Professor of Industrial Education, University of Minnesota, Minneapolis, Minn.; Dr. William E. Warner, Ohio State University, Columbus, Ohio; William F. Patterson, Executive Secretary, Federal Committee on Apprenticeship Training, Washington, D. C.; L. H. Dennis, Executive Secretary, American Vocational Association, Washington, D. C.; Elmer W. Christy, Director Industrial Arts, Cincinnati, Ohio; and John Claude of The Bruce Publishing Company, Milwaukee, Wis.

While these articles deal with the past, the editor and publishers of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION trust that they will be able to give increasingly better service in the future, and that to the thousands of friends gained by the magazine during the past 25 years, many more will be added in the years to come.

DON'T FORGET

Write for your title page and index for Volume 27 of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION. A post card is all you need to secure a copy. Do this before the indexes are out of print.

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J-31 HAND JOINTER

Six different table sizes . . . three lengths, 36, 42 and 50 inches—two widths, 6 and 8 inches . . . enable you to select the size that suits you best. For those who demand plus performance we offer the tables of larger dimensions. However, if your shop space is limited or your budget restricted you can select a smaller size and still enjoy the many benefits obtainable only in the J-31 Jointer. We will be glad to send you further information. Write today!

YATES-AMERICAN MACHINE COMPANY • BELOIT, WISCONSIN

This is the third of a series of brief articles dealing with various woods, their properties and uses. It is our hope that they might make interesting and helpful classroom material. We will welcome your suggestions as to the species of wood you would like featured in this series.

YATES-AMERICAN

The J-31 Hand Jointer is the one machine of its type which meets *all* the requirements of the school field. It offers safety, capacity, accuracy, attractive appearance and moderate price.

To make it safe, every moving part is entirely enclosed; the cutterhead, for example, is covered at both the front and rear. A belted motor drive which is optional instead of the direct motor drive, develops cutterhead speeds of 4250 and 6000 R.P.M. . . . speeds which mean greater safety by reducing pull and drag.

The capacity of the machine is great enough to handle the average work encountered in the school shop. There is no skimping in its design. To illustrate, a 2½" overwidth on the infeed table for rabbetting is provided instead of the conventional rabbetting bracket.

In appearance the machine is in a class by itself. With its smooth flowing curves and trim lines it is indeed a splendid example of modern functional design at its best.

This jointer is widely recognized as a premium value in every respect. You should investigate!

SHORT TALKS ON WOOD

WHITE OAK (*Quercus alba*)

One of the most valuable timber trees of the United States. Wood is light-brown in color, close-grained with broad pith rays, very beautiful when quarter-sawed. Strong, hard, and durable. Hard to work and nail. Likely to check and warp unless carefully seasoned.

Its many uses include ship building, tight cooperage, furniture, interior trim and flooring. Adaptable to almost any use where wood enters. In spite of its slow growth, white oak is valuable for forest, highway and ornamental planting.

Found in practically the entire eastern half of the United States in a wide variety of soils. Often forms pure stands.

It commonly reaches a height of 60 to 100 feet and a diameter of 2 to 3 feet. When grown in a dense stand it has a straight continuous trunk, free of side branches for over half its height. In the open, however, the tree develops a broad crown with far-reaching limbs, strikingly beautiful in appearance.

The bark is light ashen-gray and broken into thin irregular flakes. It is valuable for tanning. The leaves are simple, alternate, from 4 to 7 inches in length and usually divided in 7 lobes. Upper surface is bright green; lower, pale green or whitish. Turn to wine-red in autumn. The acorn is about three-fourths of an inch long, light brown, and about one-third covered by a scaled, rounded cap. Often grow in pairs.

January, 1939
Vol. 28, No. 1

INDUSTRIAL ARTS and VOCATIONAL EDUCATION

The 25th Anniversary of Industrial Arts and Vocational Education

Edward J. Lake

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University of Illinois,
Urbana, Illinois

Reminiscences by one of the editors who molded and directed this magazine from its very inception.

I am asked to write a "historical sketch" for this Silver Anniversary of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION. So this "cherished venture" has reached a quarter of a century!

It seems hardly possible that 25 years have gone by since Mr. Vaughn passed word to me at a meeting of the Western Drawing and Manual Training Association at Des Moines, Iowa, that luncheon with a few friends would give us the opportunity to discuss ways and means of accomplishing our cherished dream.

I say "our cherished dream" because Mr. Vaughn and I had frequently discussed some of the many interesting and vexing problems of "Learning by Doing" that were so evident in our schoolwork.

We concluded that the opportunity for discussion of these problems would be furthered by the publication of a magazine devoted to industrial education. Little did we foresee the elaboration of subject matter, and the increased application of school instruction to the preparation of efficient workers that would develop under this title.

Manual training and art, considered by some as frills upon the garment of Education, were to us substantial and functional parts of the whole. Five of us met at luncheon to discuss the proposed magazine: Wilson H. Henderson, Director of Vocational Education, Hammond, Ind.; Samuel J. Vaughn, Head of the Department of Manual Arts, Northern Illinois State Normal School, De Kalb, Ill.; William C. Bruce and Frank M. Bruce of the Bruce Publishing Company of Milwaukee, Wis.; and, least last, the author of these memoirs, E. J. Lake of the Department of Art of the University of Illinois, Urbana, Ill.

Several months after this meeting and for several months of each of the next ten years, this group met on Saturdays in Chicago, to submit, discuss, and formulate the contents of the INDUSTRIAL ARTS MAGAZINE.

In September, 1914, W. H. Henderson was appointed Assistant Professor of Industrial Education, University of Wisconsin. In November, 1917, the war disturbed the regularity of our editorial meetings somewhat by calling W. H. Henderson as Major, Sanitary Corps, National Army, to Washington, D. C. In September, 1918, this board was further dismembered by the appointment of S. J. Vaughn as First Lieutenant, Sanitary Corps, Fort McHenry, Md.

These interruptions were overcome, however, by the continued interest of these men and the faithful and persistent activity of the publishers.

The Purpose of the Magazine

That "Introductory" on the first page of the first number of the INDUSTRIAL ARTS MAGAZINE, January, 1914, reads like a pledge verified in the light of the 298 issues published in the past 25 years.

Quoting one significant clause from this pledge: "THE INDUSTRIAL ARTS MAGAZINE shall stand for the united arts, reaching out in manifold ways to accomplish one great aim. This aim embraces not alone the preparation for financial returns from industrial work, but also the preparation which the duties of efficient citizenship demand. This publication shall recognize some distinction, but certainly no conflict between Manual Training and Vocational Education. In the specific matter of Vocational Education, it shall stand for the wisest guidance and the best training for those who must enter early into industrial pursuits.

"But while it shall recognize the duty of the public school to offer such courses as will equip one for making a living, it shall further insist that that alone is not all that is desirable. It shall raise the insistent question, 'What kind of life is the individual being fitted to live?' In other words, it shall seek to bring into harmony, all the elements that, united, shall lead the individual to the riches and most satisfactory life of which he is capable."

In the magazine of March, 1914, appears a statement from Frederick G. Bonser, Director of Industrial Arts, Teachers College, Columbia University, which gave the editors renewed confidence. This voluntary article is titled "The Significance of a Name." In this statement, Director Bonser congratulates the Editors on the choice of THE INDUSTRIAL ARTS MAGAZINE as a name for the new periodical. Quoting from this article is the following: "Which shall it be, Industrial Arts, a subject almost unlimited in possibilities for rich thought content of fundamental importance to everyone in our day, or Manual Training, a subject, which if it remains what its name really signifies, is devoted merely to the development of the hands —Industrial Arts, a term which suggests mental content and training using the handwork as a most important means, or Manual Training, suggesting something not at all largely inclusive of mental elements?"

Some brief review of the nature of material presented in the magazine during this considerable period of development will express the purpose and appeal the editors and publishers have held in mind.

A very important interest is satisfied by exchange of information between the many teachers of the industrial arts. Whenever a good piece of work was going on, a detailed account was solicited from the teachers. The editors and publishers owe no greater obligation for the successful publication of this magazine than to the fine co-operation of the teachers.

Teachers can never be fully informed of what their colleagues are doing and thinking. The great need of such information has led to the organization in America of societies and associations available to the most rural communities and upon each of the many subjects taught in the schools. In no schools of the world do teachers have greater opportunity for conference or take greater advantage of such opportunity than in America. The reports of these associations of industrial arts teachers have been published in THE INDUSTRIAL ARTS MAGAZINE whenever available.

Actual Classroom Help

This sort of informational material from the teachers and to the teachers has composed a major part of the publication. Indeed, a review of the 298 issues of this magazine reveals that well over half of the material has been devoted to the method of doing some actual class project.

In addition to this exchange of school practice, articles prepared by expert artisans have been presented in almost every issue. It has been characteristic of these, as in all work presented, that profuse illustrations are made of each process in the order of work done. Just a few of these trade and craft subjects will give some conception of the variety of work described. In these volumes may be found: forging, hand-wrought jewelry, bookbinding, printing, pottery, mechanical and free-hand drawing, domestic arts, and a score of other subjects written by leaders in these various crafts and trades. At least one theoretical discussion of educational subjects written by someone who has given the subject particular study is presented.

Editorial comment? Well! Editorial writing is of decidedly uneven quality. Who is to censor the vagaries of the editor? Members of the staff are loath to judge critically the comments of their comrades in doubt and editors may not write as if in doubt. Sometimes a whimsical expression is assumed but that must be indulged in only on occasion. Frills and Trysquare are easily recognized as whimsical characters of decided limitations that invite the prejudice of the reader. Perhaps the best qualification of such extremes is that they put some degree of confidence in the mind of the reader by inviting a difference of opinion.

"Now Are There Any Questions?" I have always cherished this page of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION. No one may work in technical subjects without wishing for help from the professional expert. This magazine has taken pride and care in finding the answers to questions submitted by inquiring teachers who must know where and how to find what they need, when they need it. No one can know everything on demand. The wisest and most practical person knows where he may find help in emergency.

Vocational Education

Vocational education is definitely mentioned as concerned with the same great problem as art, manual training, domestic science, and household art in the "Introductory" of Volume I, No. 1 of the INDUSTRIAL ARTS MAGAZINE. Indeed, articles bearing on phases of vocational education appear in each of the issues of the Magazine. It was not until 1930, however, that the increasing emphasis on vocational education led to the addition of this subject to the name of the INDUSTRIAL ARTS MAGAZINE. Emphasis was given to vocational education by the Smith-Hughes law enacted in 1917 by the Federal Government. From then on vocational education received more attention than in all past history.

One criticism directed toward federal aid was the prediction that federal money invested in the public schools entailed federal concern and accounting which had a tendency to reduce that most valuable responsibility of the people in their own local schools. This prediction has not been verified to any positive degree.

The enrollment in federally aided trade and industrial classes reached the impressive maximum of 620,000 in 1929. Since that maximum a decrease to 470,000 in 1934 is reasonably accounted for by the depression and the increase to 540,000 in 1936 indicates future increase. Certainly the ability to make a living is added to the conscious responsibility of education toward the citizen.

There is one other thought that has been impressed upon me after many years with college students. It is that there is no more deplorable candidate for school training than one who does not care what he studies. That boy or girl of any school period who has no positive interest in any of the subjects offered in the school is without incentive to do good work. It is, therefore, necessary to interest every child in some particular kind of work. To do this some choice should be established. The earlier the better. The child's choice of a particular kind of work is not to be considered as a hard-and-fast election of a life vocation for that child. Any reasonable choice is better than no choice at all.

Vocational Guidance

The ideal curriculum for everybody will never be discovered except in the imagination of the theoretical educator. The schools must offer a rich variety of interests. Aptitudes must be carefully noted and pupils should be encouraged according to their aptitudes. But to consider that a definite and irrevocable choice of lifework must be made is to carry the matter of vocational guidance and preference beyond reason.

One article of significance in the way of vocational guidance appeared in the April, 1914, issue. It was written by James S. Hiatt, Secretary of the Public Education Association, Philadelphia, Pa.

In this article, Mr. Hiatt presents a condition of public-school instruction that has been changed for the better during later years but which is vividly illustrated as that time when less than 20 per cent of the public-school pupils entered the high schools.

Quoting from Mr. Hiatt's article: "The vast majority of those who leave enter low grade industries, untrained, unguided, unguarded, where they average between $4 and $4.50 per week while at work; where they jump from job to job, with consequent loss to the industry and to themselves. By eighteen they have reached their maximum wage, and by 30 they begin to go down hill.

"This is why vocational training and guidance are absorbing the best efforts of constructive thinkers both in industry and in education."

A surprising editorial statement appears in the July, 1931, magazine under the caption "Our Foreign Contacts": "Occasionally an author receives a comment from a foreign country on some article which he has written for INDUSTRIAL ARTS AND VOCATIONAL EDUCATION. Occasionally, too, an advertiser receives an inquiry for his product from some distant land. Then comes an expression of surprise that the publication has a foreign circulation.

"Candor compels us to state that this type of circulation is not large, yet it is scattered over many countries. Canada is foremost on the foreign list. Every country of Europe is represented, including even Russia. Then there are subscribers in India, Africa, China, Japan, South America, and Central America.

"One of the surprising things connected with this foreign circulation is found in the fact that central Europe should take so kindly to an American publication. When it is considered, for instance, that Germany has led in the field of vocational education, it becomes doubly surprising that German teachers should draw upon the new world for inspiration and guidance in this type of work.

"The answer to this may probably be found in the fact that the world war wiped out hundreds of technical publications in Europe and that the conditions since then have not been favorable to their revival. Again, the several countries of Europe, more specially those that have changed from a monarchical type government to a republican, naturally turn to this country for inspiration.

"In their efforts to regain the prestige and prosperity of a former day, these countries are anxious to learn from enterprising, energetic America, hence a publication like the INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, reflecting as it does the latest and best thought in the field which it serves, has its attractions for the educators in Europe."

In conclusion, I would congratulate teachers, editors, publishers alike on the successful publication of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION.

This magazine has enlisted the interest and service of the best informed and most progressive teachers of the subjects involved.

It has served as an opportunity of expression for these teachers as well as a source of information. The publication of the magazine has been of the best. The compilation of it has been excellent under the limitations of economical and social changes going on in our country so persistently. We conceive a major place in the educational field for INDUSTRIAL ARTS AND VOCATIONAL EDUCATION. May it continue prosperously!

An optimist takes the cold water thrown on his propositions, heats it with his enthusiasm, makes steam and pushes ahead. — *Source unknown.*

Turning the Pages

Homer J. Smith

Professor of Industrial Education,
University of Minnesota,
Minneapolis, Minnesota

An abbreviated listing of items that appeared in INDUSTRIAL ARTS AND VOCATIONAL EDUCATION *during the first quarter century of its existence.*

It has been truly pleasurable to canvass the contents of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, from its beginning to this date, and to make some notes of interest. The items here shown are offered in the hope that many others will enjoy them and that none will accept them as full and fair historical record. No sources other than the volumes have been used, no great amount of time has been expended, and meticulous care has not been taken.

Undoubtedly, many major events escaped mention, and certainly, a host of worthy entries were missed in the hurried scanning. We have here merely a miscellaneous gleaning of persons, places, writings, and occasions without guarded pattern. Our memories should be refreshed about our friends, what they were doing and thinking about, and the contributions they made as the twenty-five years have sped. It is the hundreds of little incidents, often chance and always intertwined, that make the living stream of any movement.

—1914—

Seventh Annual Convention, National Society for the Promotion of Industrial Education.
Googerty on forging, Vaughn on fundamentals, Farnum on art and industry, Lake on beauty and utility.
Third annual meeting of the Vocational Guidance Conference, Leavitt made President.
Minneapolis and Portland vocational surveys.
E. G. Cooley off to Europe and Park begins his *Vocationist*.
Calvin Woodward dies.
Sorenson on hand-wrought jewelry, Bonser on nomenclature, Bonnie E. Snow on design.
Twenty-first annual meeting of the Western Drawing and Manual Training Association.
President Wilson's Commission on Vocational Education (Smith-Lever) — Smith, Page, Hughes, Prosser, Foss, Lapp, Winslow, Miss Marshall, Miss Nestor.
Hiatt on guidance charts, Goln on bricklaying, a co-operative printing course at Rochester, and a vocational school for girls at Kalamazoo.
Credit for home work at St. Cloud and pay from Graham for schoolwork.
Selvidge, President of Western Association — speakers, Bailey, Hicks, Vaughn, Harvey, Seerley, Watson, Blanchar, Buxton, Henderson, Bennett, Crawshaw, Lake, and Dopp.
Kuns on elementary mechanisms, Loomis on a school magazine, Crawshaw defends the field.

—1915—

Bawden goes to Washington, Specialist in Bureau of Education.
Massey and Burg on prevocational education, Fultz on co-operative foundry work, Windoes on art metal, and Winslow on Portland cement.
Cooley describes his school and Crawshaw continues on organization.
Grand Rapids and New York Surveys.
Lap and Mote — *Learning to Earn.*
Cole — *Industrial Education in the Elementary School.*
Payne — *Art Metal Work.*
Taylor — *Handbook on Vocational Education.*
Ilgen — *Forge Work.*
Roehl — *A Farm Workshop.*
Blackford and Newcomb — *The Job, the Man, the Boss.*
Second Annual Convention, National Association of Corporation Schools.
Swift and Company's spelling book.
Third Meeting of the Manual Arts Conference: present, Bennett, Bawden, Leavitt, Crawshaw, Van Deusen, Griffith, Selvidge, McMurray, Schmidt, Laubach, Bailey, Newell, Buxton, and Whitcomb.
Curran on weaving, Varnum on design, Perry on cane weaving, and Zuppann on furniture construction.
Van Gaasbeek on production, Prosser on art, Bonser on repairs, and McKinney on ideals.
Roman and Cooley, back and forth, about German schools.
First Convention, Vocational Education Association of the Middle West, Leavitt made president.
More argument about dual control.

—1916—

Glynn goes to the Wisconsin State Board.
Major Moton succeeds Booker T. Washington.
Lemos on design, Dorrans on finishing, Worst on primary construction, Dougherty on sheet metal.
Bogan heads vocational education in the N.E.A.
Report on industrial education by the National Association of Manufacturers.
White and Colgrove — *Industrial Arithmetic.*
Leavitt and Brown — *Pre-Vocational Education in the Public Schools.*
Gowin and Wheatley — *Occupations.*
Roehl — *Manual Training for Rural Schools.*
Eastern Arts meeting addressed by Bonser, Bloomfield, Bailey, Small, Haney, Christy, Bogan, Brace, Varnum, Taft, and Elizabeth Fish.
Engaging articles by William Hawley Smith.
Sylvester at Hammond, Rodgers at Stout, and Adams at Mooseheart.

—1917—

Lutz and the Cleveland Survey.
Hjorth on concrete, Perry on pottery.
Harvey reports a decade of industrial education in Wisconsin.
National Vocational Education Act (Smith-Hughes).
Dean joins the Columbia faculty.
Griffith heads Western Arts and McNary the Eastern Arts.
Prosser to Washington as first federal director.
Bennett — *The Manual Arts.*
Koos on manual training in a hundred high schools.
Ruth Mary Weeks about training for girls.
Prosser and Henderson survey Denver.
K. G. Smith, Iowa, on short unit courses.

—1918—

Snedden president of the National, Bauersfeld of the Mid-West.
Bennett from Professor to Dean of Technology at Bradley.
Polk — *Vocational Printing.*
Worst — *Problems in Woodwork.*
Merton — *How to Choose the Right Vocation.*
Eaton — *Record Forms for Vocational Schools.*
Gunn goes to Wisconsin State Board.
Griffith to University of Illinois, Buxton to University of Indiana.
French — *Engineering Drawing,* second edition.
Industrial staff in the federal office, Prosser, Hawkins, Carris, Dimmitt, Leonard, Wright, Burdick, and Johnson.
Greener on rehabilitation, Levitas on printing, Sheldon on apprenticeship.
Principal Murtland of the Girl's Trade school, Philadelphia.
Stratton's "Factory Plan" projects.
Ball dies in Los Angeles.
Struck on drafting-room equipment and Tarbell and Metz on English.

—1919—

Lowell becomes director at Indianapolis, Ash at Philadelphia.
At the Western Association, Givens, Siepert, Bobbitt, Griffith, Selvidge, Bennett, Prosser, Schmidt, McKinney, and Filbey.
At the Eastern Association, Wilson, Greenberg, Edgerton, Broadhead, Parsons, Eaton, Dooley, McNary, Loomis, Gage, Oswald, Snedden, Haney, and Farnum.
Leavitt's course for the first eight grades.
Lake on the history of design, Haney on art supervision, Tarbell and Metz on safety, McKinney on what and why.

Allen — *The Instructor, the Man, and the Job.*
Bishop and Keller — *Industry and Trade.*
Rodgers — *Trade Foundations.*
Givens becomes professor at the University of Arkansas.
Baxter on concrete, Worst on raffia, Knowlton on forging, Levitas on printing, and Kronquist on art metal.
Gustaf Larsson dies in Massachusetts.
Bowman goes to Stout and Payne to Minnesota.
Mathewson is president of the Eastern Arts.
Vaughn's series entitled *First Aid to the Inexperienced.*
McDonald on trade-training objectives and Wardner on Army Trade Tests.

— 1920 —

All St. Paul teachers taking self-improvement courses.
Bogan is president of the National, Wood of the Western.
Campion to Stockton, Vaughn to the University of Illinois.
Lamkin becomes federal director.
Griffith succeeds Crawshaw at Wisconsin.
At the N.E.A. at Salt Lake City, Payne, Callahan, Kirkham, Van Dalsem, Coxen, and Brewer.
McKinney on the foreman's job, Scrimshaw on high school and trade school, and Cooley on continuation problems.
At the Oswego Part-Time Conference, Toaz, Wilson, Burdick, Ennis, Furney, Nichols, Bacon, H. B. Smith, Evans, Cooley, and Van Liew.
Whitcomb on the general project method and Lynn on the itinerant school.
Griffith — *Teaching Manual and Industrial Arts.*

— 1921 —

Johnson becomes director for Delaware, and Wreidt for Indiana.
Trybom on household mechanics and Weaver on trade tests.
Jenkins has a job-analysis class in Maine.
Mays to the University of Illinois, Cushman to the Federal Board, and Fox to San Antonio.
Mrs. Wooley resigns at Cincinnati.
Friese — *Farm Blacksmithing.*
Wright — *Automotive Repair.*
Cotter president of the Western Arts.
Greener on the plastic arts and Winslow on junior-high-school courses.

— 1922 —

Wright succeeds Carris as federal director.
Wilson president of the National, Bachrach of the Mid-West, Reagle of the Eastern.
We lose Dr. L. D. Harvey.
Howell on the general shop, Coxen on the small high school, Tock on household mechanics, Jacobs on pencil sketching, Haas on brushmaking.
Wood promoted at Indianapolis and Sylvester at Baltimore.
VOCATIONAL EDUCATION magazine begins and continues for twenty-five issues.
Hague — *Textbook of Printing Occupations.*
Brewer on tryout courses, McDonald on tests, Mays on the mechanic-teacher, Henig on accidents, and Carmen on the junior high school.
Schweickhard becomes supervisor in Minnesota.
K. G. Smith on enforcing compulsory part-time attendance laws.

— 1923 —

Dr. Haney dies in New York.
Mays on enrichment, Fryklund on standards, King on co-ordination tests.
Ash to the University of Pennsylvania, Leonard to Columbia.
Prosser heads the National, Greer the Mid-West.
Sowers to Miami, Bauder becomes director in Philadelphia, Bawden to Tulsa.
Thirteenth annual meeting of the Manual Arts Conference under Bawden.
Strong and Uhrbrock — *Job Analysis and the Curriculum.*
Berg and Kronquist — *Mechanical Drawing Problems.*
Welsh — *Elements of Sheet Metal Work.*
Selvidge — *How to Teach a Trade.*
Bonser and Mossman — *Industrial Arts for Elementary Schools.*
Kuns on auto mechanics, Varnum on pewter, Sturtevant on drawing tests, Bowman and Tustison on home mechanics.
Land studies the duties of supervisors, Schmidt vocational trends, and McDonald the Allen and Selvidge methods of trade teaching.
Nelson becomes president of Stout.

— 1924 —

Ira S. Griffith leaves us.
Norris and Smith — *Shop Arithmetic.*
Henry — *Essentials of Printing.*
Bowman — *Graphic Aids in Occupational Analysis.*
Keller — *Day Schools for Young Workers.*
Edgerton to the University of Wisconsin, Winslow to Baltimore, Whitney to the University of Pittsburgh.
Hague and Salade on printing, Coates on history, Twogood on learning difficulties of tools, and Tarbell on part-time instructors.
At the superintendents' meeting in Chicago, Bennett, Kitson, Dennis, Myers, Collicot, Edgerton, Briggs, Rodgers, K. G. Smith, Leavitt, and Leonard.
Bogan president of the Mid-West.

— 1925 —

Cressman to the Pennsylvania State Department, Dennis and Struck advance there.
Shepherd of Oregon and Bonnie E. Snow pass from our ranks, also Dr. Burgess of Bradley and Hugo B. Froehlich.
Haynes — *Teaching Shopwork.*
Prosser and Allen — *Vocational Education in a Democracy.*
Crispin begins on technical terms as a series.
Edgerton on the curriculum, Stockwell on junior-high-school purposes and part-time laws, Kelley on the general shop, Alberty on vocational choices.
Hatch is president of the Eastern Arts.
Day to Kansas City, Henderson to Honolulu, Stockwell to California, Newell to Boston.
Laubach on the project method, Van Oot on teacher's difficulties, Emerson on vocational programs in senior high school, and Rasche on continuation schools.

— 1926 —

Bennett — *History of Manual and Industrial Education up to 1870.*
Lee is president of the National, Christy of Western, Ryan of National Guidance, and Hopper of the Eastern.
Friese — *Exploring the Manual Arts.*
Wilson — *Primary Industrial Arts.*
Evans — *Educational Opportunities for Young Workers.*
Selvidge — *Individual Instruction Sheets.*
First Meeting of the A.V.A. at St. Louis.
Professor Usry dies.
Schmidt's score card for teachers and Schweickhard's for departments.
Burling on costs, Diamond on grading, Van Oot on foreman training, Woellner on learning difficulties, and Horning on the MacQuarrie Test.
Nichols to San Jose, Chapman director in Georgia, Travers to Oakland.
At the N.E.A. Bauder, Struck, Horridge, Briggs, Gill, McGarvey, Henderson, and Miss Rudolph.
Another of Parker's stimulating articles.
At the Eastern — Bailey, Wilson, Snedden, Trinder, Hubbell, Watson, Anderson, Bonser, O'Leary, Hepner, Constantine, Cressman, Keller, Denham, Coates, and Milliken.
Wetzel becomes supervisor for Missouri.

— 1927 —

Campion heads the Wiggen Trade School, Kent to Baltimore, Hall to Camden.
Congressman Hughes dies and Gustafson of Rankin.
Selvidge on teacher's plans, Tock on grading, Trybom on household mechanics, and Brace on the junior high school.
Lewis succeeds Patty at the University of Indiana, Greenly goes to the University of Akron, and Cox to Oregon State.
Wilson advances in New York State and Bedell in Detroit.

— 1928 —

Cooley heads the A.V.A., Anderson the Eastern.
Mays to the University of Illinois, Paine to the University of Toledo, Bawden to Manual Arts Press, Bogan becomes Chicago's superintendent.
Badger to Tulsa, Manzer to Bronxville, Hunter to Iowa State, Cleeton advanced at Carnegie, Turner heads Rankin.
Swope on shop rating, Abercrombie on grading, Bauder on co-operation.
At the A.V.A. — Leavitt, Kunou, Tagg, Van Westrienen, Bawden, Mays, Bedell, Selvidge, Hunter, Ash, Bogan, Dennis, Sheldon, Haynes, Cooley, Snedden, Prosser, Whitney, Cushman, Stanton, Wright, Allen, Sylvester, Lee, Keller, O'Leary.
Newell — *Wood and Lumber.*
Kuns — *Automotive Essentials.*
Adams becomes director for Oregon, Fulmer for Nebraska, Wells becomes supervisor for Indiana.

— 1929 —

Campbell on drafting-room management. Hippaka same, Mays on historical background.
Schweickhard — *Industrial Arts in Education.*
Wright and Allen — *Efficiency in Vocational Education.*
Friese — *Cosmopolitan Evening School.*
Newkirk and Stoddard — *The General Shop.*
Lee — *Objectives and Problems of Vocational Education.*

Miller heads National Association of State Directors.
Backus becomes director at Newark, Martin heads Delgado, Anderson heads Lathrop.
Rodgers on guidance through vocational training.
Brunton is supervisor for Pennsylvania, E. L. Bowman succeeds Trinder in Connecticut.
Crispin — *Dictionary of Technical Terms.*

— 1930 —

Sieker dies and is followed by Rasche at Cooley's school.
Chapman president of A.V.A.
This magazine changes its name to INDUSTRIAL ARTS AND VOCATIONAL EDUCATION.
We lose Rodgers, Mathewson, and Kalson.
Kunou on manual education, Van Duzee on safety, Bedell on equipment and supplies, Brace on vocational work in high school.
Hjorth — *Principles of Woodworking.*
Mays — *An Introduction to Vocational Education.*
Ericson — *Teaching Problems in Industrial Arts.*
Selvidge and Fryklund — *Principles of Trade and Industrial Teaching.*
McGee and Sturtevant — *General Mechanical Drawing.*
Brown and Tustison — *Instructional Units in Hand Woodwork.*
Freeland leaves to be director for Hawaii.
Thompson becomes supervisor for Illinois, Owen for Nebraska, Widdowson for Minnesota, and Zoerb for Tennessee.
Warner on the general shop and Day on objectives.
The A.V.A. report on standards in industrial arts.
Landers to New York University and Schweickhard as director in Minneapolis.

— 1931 —

Hemmer on co-ordination, Hatch on guidance through industrial arts, and Orness on shop-class management.
Sears — *Roots of Vocational Education.*
Wood and Adams, secretaries of the Western and Eastern.
Safety-poster series by Van Duzee.
Abbott dies at Grand Rapids, succeeded by Reagh.
Shane of Ames retires, Newkirk to Chicago Normal College.
Diamond's series on technical education in Great Britain.
Fern on patternmaking and molding, Yager on cement and concrete, Nash and Van Duzee on tests, Van Westrienen on lesson sheets.
Miller heads the A.V.A.
Another of Henig's objective reports.
Dooley's textile high school.

— 1932 —

Henry Turner Bailey passes away. Kerschensteiner of Munich, Painter of Minneapolis, Edminister of Pratt Institute, and Cauch of Oakland, likewise.
Fries goes to Penn State.
Wittich on industrial visits, Bedell on the general shop, Chambers on waste in shops.
O'Leary heads the A.V.A. and Warner the Western Arts.
Myers, Little, and Robinson — *Planning Your Future.*
Timbie — *Essentials of Electricity,* revised.
Hall — *Trade Training in School and Plant.*
Ricciardi and Kibby — *Readings in Vocational Education.*
Warner's group photograph of twenty-four men who began teaching before 1900.
Lynn on the response to federal aid, Phelps on illustrative materials, and Davison and Bedell on pupil-personnel organization.

— 1933 —

Taylor on supplies, Mays on the teacher, Bollinger on lighting systems.
Cox of Milwaukee Tech dies, Brown and Ziegenhagen move up to lead.
Technical vocabularies series begun by Shuman.
Hadden of Greeley passes, and Troutman in Michigan.
Waidelich's Lesson Unit Rating Sheet.
Roberts retires at Cleveland.
Manzer on leisure, Van Westrienen on larger classes, Fryklund on the instructional unit, and Bedell on panel discussions.
Bowman on industrial education and change in the social order.
More responsibility for Wood at Indianapolis.

— 1934 —

Fisher Body coach-building contest, the fourth.
Eaton dies at Yonkers and Perry at Pratt Institute.
Sowers begins the wood-carving series.
Osburn on aesthetic values, Pelikan on exhibits, Warner on shop planning, and Carlson on individual instruction sheets.
Series on the development of woodworking tools by Wyatt.
Bawden and others — *Industrial Arts in Modern Education.*
French and Svensen — *Mechanical Drawing for High Schools,* third edition.
Hoelscher and Mays — *Basic Units in Mechanical Drawing.*
Gottshall on Design, Dougherty on teacher certification, and Lindeman on aids for the school shop.

— 1935 —

National Conference on Industrial Arts, Proffitt, Bauder, Bedell, Christy, Fales, Mossman, Rudolph, Smith, Sotzin, Warner, and Winslow, Bulletin issued.
Hambrecht heads the A.V.A.
Perry of Milwaukee dies and Wilhite of Muncie.
Johnson to Wiggins Trade School, Jackey to the University of California at Los Angeles, Bawden to Pittsburg.
Warner on research, Cramlet on aims, Tibbitts on co-ordination, and Sylvester on vocational education.
Roberts — *Beginning Woodwork Units.*
Newkirk advances in Chicago, Schweickhard in Minneapolis, and Barker in San Francisco.

— 1936 —

The George-Deen Act.
Lee joins the N.O.C. as leader, Emerson to Yonkers.
Bogan dies, and Vaughn. Leavitt retires.
First convention of Future Craftsmen of America.
Burgett on graduate work.
A.V.A. at San Antonio.
A survey of drafting-room practices by Kepler, and Sotzin likewise.
Douglas and Roberts — *Instructional and Information Units in Hand Woodworking.*
Newkirk and Greene — *Tests and Measurements in Industrial Education.*
Fryklund and La Berge — *General Shop Woodworking.*
Tustison and Kranzusch — *Metalwork Essentials.*
Moore takes charge in Cleveland, Bird in Rochester, Greenly goes to Purdue.
Warner on interpretation, Struck on our challenge, Mays on moral education, and Karch on a typesetting contest.
Feuerstein heads the New England Association.
Jones advances in the Pennsylvania State Department.
Waffle on drawing, Radford on industrial trips, Osburn on the curriculum, and Cramlet and Hunter on the home workshop.

— 1937 —

Bennett's second historical volume, 1870 to 1917.
Bass moves to Rankin, Fryklund to Wayne, Tagg to his state department, and Whitney to his.
Bedell succeeds Trybom, Hinderman to Denver.
Lynn of Ames leaves us.
Series of Lessons for Young Workers begun by Diamond.
Bedell and Gardner — *Household Mechanics, Industrial Arts for the General Shop.*
Timbie — *Elements of Electricity,* third edition.
McComb on apprenticeship, Hughes on teaching aids, Williams on hobbies, Cox on progressive education, and Luddington on the smaller schools.
Klinefelter advances in the Washington office.
Moore heads the Western Arts.
Ashley writes on research and Hunter on philosophy.
Quigley, president of A.V.A.

— 1938 —

Charles R. Allen dies, also Martin of Texas, and McLaughlin of Ohio.
Widdowson to the University of Minnesota, Twogood to Ames, Emerson to Cornell, Ashley to Yonkers.
Dalton succeeds as K. G. Smith retires.
Cushman advances to vocational consultant
Hjorth — *Machine Woodworking.*
Fryklund and Kepler — *General Drafting.*
Woodin — *Home Mechanics for Girls.*
Smith — *Machine Woodworking.*
Lee — *Objectives and Problems of Vocational Education,* revised.
Struck — *Creative Teaching in Industrial Arts and Vocational Education.*
American Association of School Administrators, Atlantic City meeting, ten papers on industrial education read and subsequently printed, special bulletin.
Ashley on method, Hunter on industrial-arts laboratories, Kroll on industrial arts for girls, Robert Smith on method.
Westmoreland on attitudes and ideals, Fleming on success prediction, McKinney on distinctive elements, and Mann on safety.
Lee to Columbia.
St. Louis is host to A.V.A.

On Coming of Age

William E. Warner

Ohio State University,
Columbus, Ohio

An interesting and helpful analysis of the evolutionary phases through which industrial arts and vocational education has passed during the past quarter century.

Well-merited congratulations are due the publishers and the editor of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION on this, the twenty-fifth anniversary of *their* — or should I say *our* — magazine. The Milwaukee visitor discovers to his pleasure that three generations of Bruces are at work daily on its production and distribution.

A magazine of this sort is of necessity a *reporting* and not a *projecting* device. It is an excellent barometer or weather vane but neither the cause nor the judge of our professional weather. Perhaps that is as it should be. The destiny of our profession or professions is up to us as individuals and to other devices and agencies. It would be interesting to scrutinize these in terms of their present effectiveness, but that is not the subject of this article.

Professionally, and from the point of view of evaluation, it is all too revealing to turn back through the twenty-five years of pages and speculate on the progress that has been made. No single trend stands out sharply in transition, but it is perfectly reasonable to identify and characterize certain overlapping points of emphasis that indicate change and a presumed *coming of age*. Many things make this difficult. The variables, among other things, include: Legislation, subsidies, personalities, teacher education, equipment and supply manufacturers and distributors, the concepts of general education, research and invention, literature, economic and social trends, isolation — not to mention the professional associations and local, state, and federal officials and programs.

Shopwork for adolescents was well established as a subject in the schools at the time this magazine was founded. Shopwork, as such, had gained a splendid momentum during the preceding thirty years, as is so well revealed by an examination of the National Education Association and certain city, state, and federal reports. Organized agitation for the federal support of vocational education had been under way since 1905, and some mature public programs of the continuation-school type were well launched in Massachusetts and Wisconsin. Many private schools of the technical type were doing splendid work, particularly in the east. The influence of such men as Richards, Bennett, Griffith, Park, Varnum, Selvidge, Dean, Roberts, Rodgers, Snedden, and Bonser was just being felt.

The accomplishments of the period 1914–1939 may be classified under certain categories which, for present purposes, are identified tentatively as *ages of emphasis* or trend. No one should misunderstand these characterizations or think of them as final. They are simply one reviewer's conclusions.

Age of Skills and Handicrafts

The terms *manual training* and *manual arts* described two points of emphasis that may be thought of as dominating the period when this magazine was launched. Although the present writer was not fortunate enough to have known either of the original editors, E. J. Lake or S. J. Vaughn, it is reasonable to suspect that they personified the technical competence and artistic ability required of the concepts back of manual training and manual arts. It has never been made quite clear why manual training received so much support, except that it seemed to be *practical* in the trade sense, and seemed to stick pretty closely to a few of the commoner trades such as cabinetmaking, carpentry, turning, mechanical drafting, and wrought-iron work. These crafts or trades were common prior to the present-day involved technology of production industry. The handicraft movement was equally well defined and Bennett's use of the term *Manual Arts* since 1894 was well understood to include the production of handwork that would be useful and artistically done. The early articles of this magazine exemplify such concepts again and again. No one — or rarely did anyone — question the validity of such work nor bother to worry about its permanence. It still endures — yes, even persists.

Age of Standards and Tests

Common with the awakening of psychology, there developed a comparable interest in standards and tests that almost exactly parallels the life of this magazine. The first pronouncement in industrial-education literature came out in the form of a monograph as early as 1912. Griffith and then Selvidge, as well as Varnum, did much early work on the topic, and the old Western Drawing and Manual Training Association as well as other agencies sponsored such work, in which several men excelled. William L. Hunter's tests were monumental, and the work of Harry B. Nash and Roy R. Van Duzee, as well as Louis V. Newkirk, was prominently received. Professionally, it appears at this distance as if we were in search of a way and a device that would tend to secure or make permanent those developments identified in the first era or age. The movement, although buried in techniques, did not exhaust the possibilities. For example, only 30 per cent of the possible types of test elements have ever been used in tests pertaining to industrial arts and industrial-vocational education. Some of the work may be fairly thought of as pursuing a wishful instead of a valid philosophy, but the ambition for security and the firm establishment of *improved* shopwork in the American schools was clearly the aim at all times.

Age of Light and of Darkness

With the subsidies of the Smith-Hughes Act in 1917, when this magazine was but three years old, there developed a tremendous impetus for vocational education in the United States. It was almost as if a bright light were suddenly flooded down the highway, making possible what the leadership had so longed hoped for and promoted. While this splendid subsidy paved the way for *vocational* programs in all the states, it did not correct the malpractices and whimsical assumptions of manual training and other work of this sort that had gained momentum on every hand. Furthermore, some of the more promising men who had been working in these older fields were suddenly transferred to splendid new positions made possible by the Smith-Hughes Act. It was inevitable that industrial arts as such should experience an age of professional darkness that persisted until the postdepression awakening. It simply had no sponsorship, and there was a general letdown on the part of the leadership in general education as a result of the subsidy. People forgot that there was a whole program of general education which, of course, could not and did not need to be subsidized. The result was that many programs simply coasted along, and many are still doing so. The most tragic incident of the period was in the depths of the depression, when all of the *manual training* in the public schools of Chicago was summarily abolished in the spring of 1933. While this was done in order to make way for a much more progressive and valid type of work, yet the incident was but one of many in the interim from 1917 to 1933 that help define it as a period of darkness for shopwork of the types belonging in the program of general education.

Age of Enrichment and Expansion

This characterization applies not only to various phases of the practical arts, but to all types of vocational education as well. The dominating concept of orientation which characterized the junior-high-school movement that has paralleled the life of this magazine is also the principal concept

back of programs in the practical arts for adolescents. It was natural and inevitable that the thinking about shopwork should be refocused upon what children did and on what they needed in order to adjust themselves to the occupational opportunities and technological complexities of an industrial age. Instead of performing in one material — wood — many were now introduced in *general shop* and *laboratory of industries* programs. Instead of bench woodworking and wood-mill techniques, all of the basic ways of handling all of the common materials and producing the products of industry were introduced and studied, by girls as well as boys.

Programs on all school levels, from the first grade to those for the most mature adults, were scrutinized and developed. The work in the elementary school early launched by Bonser and others was made increasingly common by the widespread adoption of *activity* concepts of education. It was not strange that college programs such as the one at Greeley, Colo., and at De Kalb, Ill., should embrace types of industrial arts in their core curriculums simply because modern-day society is an *industrial* society.

The depression focused greater attention than ever before on *leisure* and the need for worth-while recreational programs, and also on the social and economic necessity of *consumer literacy*. These two concepts, along with *orientation*, now dominate the general education programs in industrial arts for adolescents and adults.

The expansion, however, has not been and will not be successful on all sides, simply because the planning has not been mature, or because of inadequate text and reference materials, or because of the insufficient supply of master teachers, or simply because the nature of the modern program has not been clearly understood and presented. But these are not insurmountable obstacles. An expansion such as that now under way would have been impossible prior to the depression because of equipment costs if for no other reason. The depression, however, has brought about the production of a variety of inexpensive and smartly designed equipment that now makes a total program possible for no more cost than the well-developed woodworking program of old. Obsolescence is now a factor of grave consideration, whereas the former concern was to equip for permanence. Future contributions to this magazine can do much to indicate the direction that enrichment and expansion should take. For example, what of the graphic arts in contrast to printing, ceramics in contrast to pottery, housing in contrast to carpentry, communication in contrast to electric wiring, and the like?

Age of Professional Consciousness

As the program of enrichment and expansion caught its stride, and as the destiny of vocational education became apparent under the federal subsidies, there was quite an awakening to a professional consciousness, particularly in the leadership of the latter group. Much confusion prevails, however, in some of the states, and particularly in the regional associations as well as in the certification bodies and even in the National Education Association, concerning the organized sponsorship and development of industrial arts and vocational education.

The confusion lies in the general failure of all interests to analyze their contribution in terms of a revitalized program of American education. Any aloofness from the general program can only prove costly in the end. Much good will result, however, when the professional forces back of those so-called practical or functional areas of education that are reported in this magazine, can join in the redefinition and work of the total school program. Our possible contribution is a great one and so badly needed now, as witness the first releases of the New York Regents inquiry.

Age of Scholarship and Enlightenment

The trend toward comparable academic status on the part of shop teachers in relation to other areas of education has also been a movement that has paralleled the age of this magazine. One hundred eighty colleges, institutes, and universities are now actively concerned in the training of various types of shop teachers on the baccalaureate level. Master's degrees are now possessed by approximately 1,500 shop teachers in the United States, and there must be at least 100 doctorates that have majored in areas of education that relate to the subjects that interest the readers of this magazine. The inevitable result has been and will increasingly be an *objective* approach to the study and development of industrial arts and vocational education. The authoritarian basis — yes, and even a political basis — was not at all uncommon, and still persists. Such an approach in the development of our program is, of course, unsound. We cannot help being optimistic, however, at the present trend.

Articles during recent years have dealt with such ambitious subjects as the psychology of . . . integration, progressive, socialization, learning, philosophy, research, method, the doctorate, and the curriculum. These are but additional and wholesome evidences of scholarship and a resulting enlightenment. The use of citations is a further evidence of *coming of age*, so much so that the reader may well question the maturity and validity of articles not written in the objective manner and backed by the liberal use of citations. Empiricism is and always has been an expensive luxury.

Age of Philosophy and Research

One hesitates to identify a seventh and concluding age in the development of our profession during the past quarter century. It seems evident, however, that we are coming of age along scientific lines as a profession. Dr. Lawrence F. Ashley's ten distinguished presentations from June, 1937, to September, 1938, are mute evidence of that fact. Their significance is best demonstrated by a review of the topics treated: *Scientific Method and Historical Research; Documentary Methods and Techniques for Data Gathering; Research Possibilities in the Laboratory Organization; Opportunities for Historical Studies in Industrial-Arts Education; Chronological Development of the Industrial-Arts Concept; This Thing Called "Method," I and II, Purposeful Experience for Beginners in Drawing, Woodworking in the Schools of Tomorrow; Leaving the Crossroads in Teacher Education.*

It is axiomatic that the truth will prevail. Young industrial-arts teachers in particular, as well as everyone else concerned with going forward with this magazine through the years to come, will quickly and wisely bend their efforts toward actively ferreting out the biological, social, and economic as well as cultural implications of the professions in which each is interested and then to scrutinize and appraise the curriculum trend. There is a distinct trend toward a functional type in contrast to the old means type as is illustrated by such industrial-arts curriculum classifications as *power, records, transportation, housing,* and the like, in contrast to *electricity, printing, auto mechanics, woodworking,* and *mechanical drawing,* not to mention the subtleties of method, evaluation, teacher education, and that most significant point of all — wholesome public and professional relations.

This magazine in the quarter century ahead should prove to be an even finer instrument for disseminating the evidences of progress than has been possible during the past twenty-five years, if we master the ways of philosophy and research, as well as practice, so our profession may achieve its deserved place in the sun of the American program of education.

Rewinding armature for 50 h.p. motor. Seneca Vocational School, Buffalo, N. Y.

Progress of School Shops 1924-1938

John Claude

Milwaukee, Wisconsin

What the lists of the Bruce Publishing Company disclose about the school shops of our country.

The questions "What geographical areas in the United States have the most school shops?," "What has been the progress of industrial arts in the high school, or how is the junior high developing?," "How much did the depression hurt the school shop?," and the like, have been asked again and again without eliciting any definite answers.

To obtain some kind of information on this, a search was begun of available records that would present a fairly accurate picture of the facts desired. Various government tabulations on vocational education were checked but nothing could be found that would accurately portray the activity in the industrial-arts field. The compilations used in this article, therefore, were taken from information on school shops gathered by the list department of The Bruce Publishing Company, for the past fourteen years. It was comparatively simple to prepare from this information the charts, maps, and diagrams presented. In some years, various factors have interfered with the making of a complete check-up on the school-shop field, nevertheless, the data provided is quite reliable.

For purposes of discussion, it was determined that teachers and shops should be used as a basis rather than departments, because in some schools, one woodworking department is likely to have a number of different shops and teachers, while in other schools one man may teach not only woodworking, but also drafting, metalworking, electricity, and possibly other subjects. He may do all this in one room, nevertheless, he is teaching so many subjects and each subject is a typical school-shop activity. Consequently, the term *school shop,* in this article, is to be regarded as referring to a shop activity in a single subject, irrespective of whether it is one of a number of those taught by the same teacher.

Some may be disappointed because none of the charts show the history of the general shop as such. It was felt, however, that most administrators and teachers would be satisfied to obtain a picture showing the development and progress of industrial arts and vocational education, on a national scale, for the six basic subjects: Woodworking, drafting, metalworking, auto mechanics, electricity, and printing.

Included with woodworking are the classes in cabinetmaking, carpentry, and patternmaking. Metalworking embraces the school machine shop, the foundry, the forge, welding, and the sheet-metal shops. Under drafting is included all mechanical drawing, machine drafting, and architectural drawing.

Geographical Distribution of School Shops

The map shown in Figure 1 is divided into the nine geographical divisions that are commonly employed.

This map strikingly corroborates the generally accepted fact that the greatest activity in industrial arts and vocational education is concentrated in the Central States. The largest number of school shops devoted to the subjects previously listed on the levels of the teacher college, high school, junior high school, technical high, and full- and part-time vocational schools, are in the East North Central States. In these states, there are more than 8,000 of these school shops. The second largest group, with over 6,000 school shops, are the West North Central States. It is interesting to compare population and number of school shops found in the West North Central States, and those located in the Middle Atlantic States. The population of the first mentioned of these groups is 12,461,000 and that of the Middle Atlantic States is 27,243,000. Yet there are over 2,200 more school shops in the western area. Obviously the future growth will have to go eastward.

The development of school shops in the Pacific States shows greater growth than was at first anticipated. The growth in the South Atlantic States is very apparent when it is noted that there are over 2,400 school shops in this area.

Of the Mountain States, in which there are over 1,600 shops, the state possessing the greatest number is Colorado with about 400 school shops. Utah is second with about 350 school shops.

Among the lows are the East South Central States, but it should be noted that Tennessee, with its 500 school shops, is typical of one of the fastest developments in industrial arts and vocational education in recent times. This state can be quite proud of the fact that it was one of the first in the country to include industrial-arts and vocational-education texts on the same footing as academic texts on its state adoption lists.

The West South Central States, which include the enormous State of Texas, show up well with the general average.

In the New England States, the State of Massachusetts has more school shops than the five surrounding states. The combined population of these five states is 4,122,000, while that of Massachusetts alone is 4,375,000. To Massachusetts also can be attributed many of the men whose inspiration and leadership have made possible the spread of industrial arts and vocational education in the East North Central States.

Figure 2 presents a map in which the distribution of school shops is shown by states rather than by geographic divisions. This map shows that the leaders are California, Ohio, and New York. California has a larger number of school shops on the levels mentioned than any other state in the Union. Pennsylvania, Michigan, and Iowa, in the order named, are the leaders in the next lower numerical

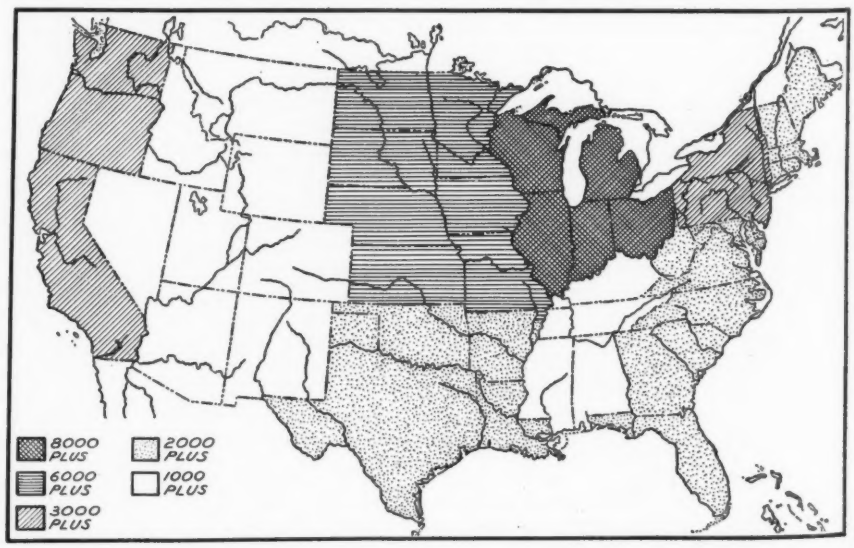


Fig. 1. The numerical distribution of industrial-arts and vocational-education shops by geographical divisions

bracket. Indiana and Illinois run neck and neck heading the third largest group, with Kansas next, followed by Massachusetts and Wisconsin. Then come Minnesota and Texas, each of which has about an equal number of school shops.

The fourth group, with 1,000 to 500 shops per state, is led by Missouri followed by Oklahoma, New Jersey, Washington, and then Tennessee and West Virginia which have about an equal number of school shops.

In the fifth group, 500 to 250 shops, there are quite a number of states. Nebraska is first, Colorado and Maryland are tied for second, Virginia is third and North Dakota fourth. Kentucky, Oregon, Alabama, Arkansas, Connecticut, Florida, and South Dakota have about the same number of shops.

Proportion of School Shops to State Population

The figures used to prepare the diagram shown in Figure 3, were obtained by dividing the number of school shops in each state into the total population for that state.

According to this diagram, Iowa, Kansas, and Utah, have proportionately more school shops available for the people living in those states than are provided by any other states in the Union. Nevada, Wyoming, and North Dakota also are outstanding. Delaware, though not large, outranks Ohio, Michigan, and Wisconsin.

Figure 4 shows how the subjects taught in the school shops in the various states compare to each other.

As was to be expected, woodworking shops outrank the other activities. The farmshop is next and then comes drafting. It may have been commonly supposed that there would be as many mechanical-drawing classes as there are woodworking shops. This is not borne out by the facts.

Metalworking is next, as shown in Figure 4, and the popularity of electricity is also quite apparent. This diagram shows the interesting fact that printing and auto mechanics enjoy about an equal popularity.

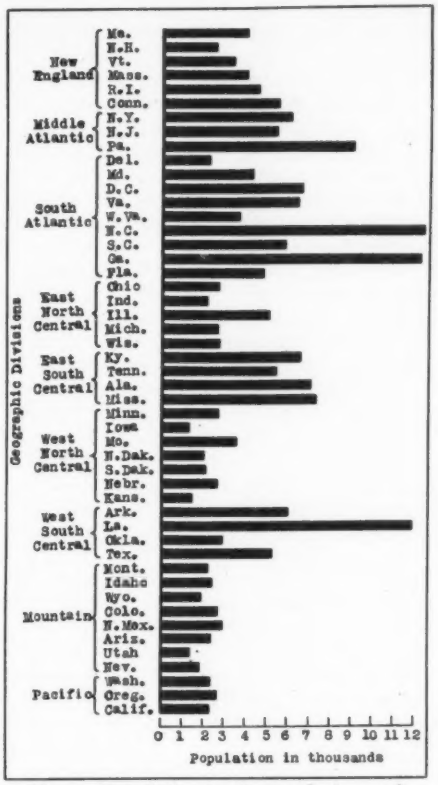


Fig. 3. Population in thousands for each school shop

Figure 5 shows the progress of shop subjects in the high school. It is in this level of education that the school shop enjoys its greatest spread. It was originally started on this level, and then spread into the upper elementary grades which now embrace the junior high school.

The beginning of the depression stopped the growth of the school shop only momentarily in 1929. Some subjects seem not to have been halted at all, but it is quite evident that for every school shop discontinued from 1929 to 1934, there have risen several new shops.

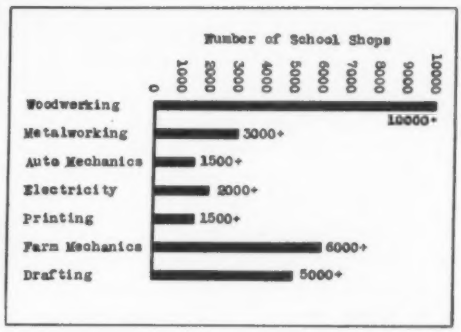


Fig. 4. Proportionate number of school shops in most active subjects in 1938

From 1934 the growth seems to have been accelerated until now it appears that the school shop is again in a position similar to that in 1924, and that it is ready to rise to heights never dreamed of before.

The junior high school was just about coming into its own in 1924. It is on this level that the general shop has had its greatest growth. This could not be definitely established, however, from the sources from which this material was compiled.

Figure 6 shows the progress of shop subjects in the junior high school. Hidden in the metalworking graph is the story of the growth of the machine shop as against the sheet-metal shop; the growth of bench metal as against the old tinsmithing of former years; the decrease in the number of forge shops, as such, which are now utilized as only a portion of an activity

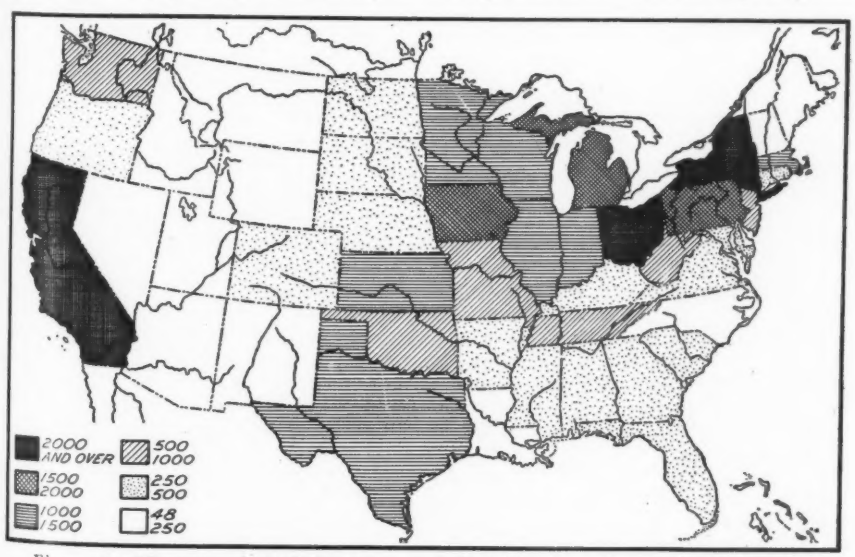


Figure 2. The numerical distribution of industrial-arts and vocational-education shops by states

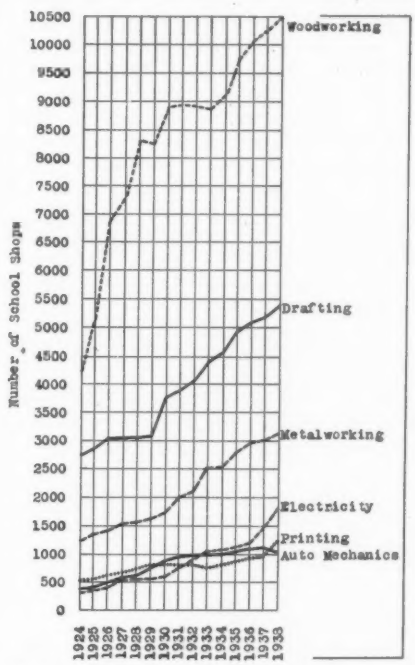


Fig. 5. Diagram showing the development of shop subjects in high schools

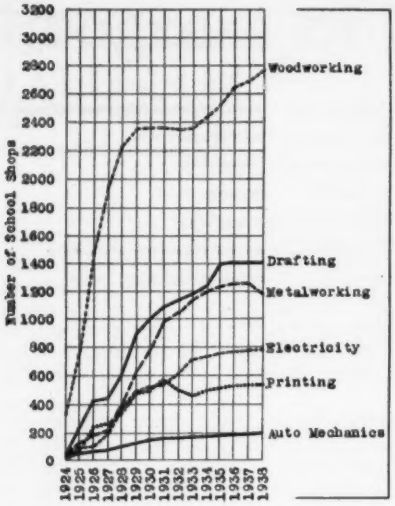


Fig. 6. Diagram showing the development of shop subjects in junior high schools

rather than as a major activity in itself.

Figure 7 shows the progress of shop subjects in the technical high, and full- and part-time vocational schools.

While Figures 5 and 6 depict industrial arts, Figure 7 portrays vocational education. To equip a woodshop, a machine shop, or a printshop on the vocational level costs money. The diagram in Figure 7 shows an investment of comparatively large amounts of money in buildings, equipment, tools, etc., designed specifically for the purpose of training youth for the industrial world. As shown by the diagram, woodworking is not as dominant as in the junior or high school, while metalworking shows a considerable increase. The forge shops devoted in the past to forging gate hasps are things of the past. The emphasis in these shops is now on heat treating and metallurgy, and the teaching of oxyacetylene and electric arc welding. The school machine shops of the vocational school now stress screw-machine, turret-lathe, and milling-machine operations from a production standpoint. The fact that metalworking had such a drop in 1933 is possibly due to the curtailment of many shops in the bleak years, 1932 and 1933.

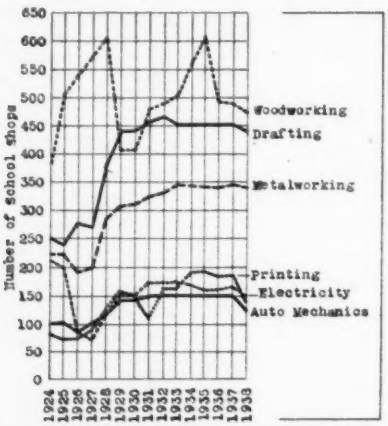


Fig. 8. Diagram showing the development of shop subjects in industrial-arts teacher training colleges

The drop in electricity is hard to explain. This subject has been more guilty than any other of preparing graduates far in excess of what industry can absorb. It may, therefore, have experienced a decline because the school has been unable to place many of the electricians it prepared.

The machine shop in the vocational school has enjoyed a growth of 260 per cent between 1924 and 1938. The growth of the so-called sheet-metal shop which in 1924 was primarily a tinsmith shop and which now is the bench metal, the metal-fitting or the metals laboratory is the most pronounced. The difference in the figures of then and now indicates a growth of 450 per cent. The woodshop increase for the same period is 130 per cent. Auto mechanics has enjoyed the greatest percentage of growth — 580 per cent.

The diagram in Figure 8 shows the progress of shop subjects in the industrial-arts and vocational-education departments of teacher-training colleges and universities. This is probably the most difficult diagram to analyze. In keeping with the increase in subject activities in the lower levels, the work here, other than electricity, showed a gradual rise. A recheck has failed to show the reason for the drop in 1928 when actually this should have occurred in 1929. The progress of the

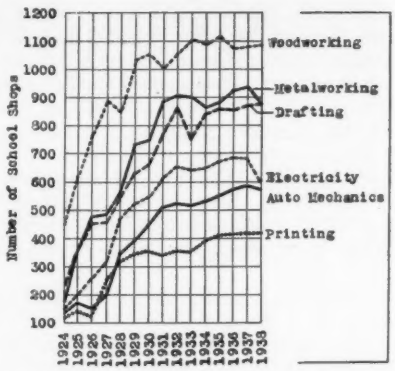


Fig. 7. Diagram showing the development of shop subjects in the technical part-time and vocational schools

other subjects, however, parallel each other. For the past ten years, insofar as drafting, metalwork, electricity, printing, and auto mechanics are concerned, there has been practically no increase in the number of shops on this level.

Not apparent in the record, however, is the improvement with respect to equipment that has affected some of these shops. While there are colleges that have exceptionally well-equipped shops, too many of the normal school and college shops are still as they were years ago. Only a few are setting an example for their teachers-in-training of what should really constitute good shop equipment.

Twenty-Five Years of Apprenticeship in America — 1913-1938

William F. Patterson

Executive Secretary,
Federal Committee on Apprenticeship Training,
Washington, D. C.

A historical résumé of what has been done in the training of our skilled workers during the past quarter century.

This discussion of apprenticeship should serve as a sort of revolving beacon that will reveal the events of the past twenty-five years and light up what we may expect of apprenticeship in the twenty-five years to come. Consideration of apprenticeship in this magazine's silver jubilee number is particularly appropriate, since these twenty-five years very nearly span the period between the first modern apprenticeship law in Wisconsin in 1911 (amended 1915–35) and the enactment into federal law of the Fitzgerald Bill in 1937, making the promotion of apprenticeship a permanent responsibility of the U. S. Department of Labor, and for the first time designating a federal agency to deal with the specific problem of apprenticeship.

During those twenty-five years, circumstances tended to hamper the development of apprenticeship in the United States. Long before our own entry into the conflict, the world war of 1914 and the exigencies of production incident to that fevered period stimulated the mushroom type of training designed for developing specialized techniques rather than thorough skills. The next few years, it is true, revealed to the observant a significant need for the application of sounder methods of training skilled workers, but the depression of 1920–21 cut sharply athwart any attempts at systematic apprenticeship.

The decade starting in 1920 saw the first concerted move for a national system of apprenticeship, and the American Construction Council's program of 1923 — of which we shall speak in greater detail later — foreshadowed many of today's objectives. All through the 1920's, the effort to

develop apprenticeship persisted and gained some ground — especially in the construction industry and particularly after the restriction of immigration limited the recruiting of large numbers of our skilled workers abroad.

Of apprenticeship legislation in the modern sense, as has been stated, Wisconsin was the pioneer. In 1911, the state passed a compulsory-education law requiring all employed workers between the ages of 14 and 16 to attend school for four hours a week, and requiring all apprentices to attend for five hours each week the newly established part-time school. This rudimentary measure of 1911 was followed in 1915 by passage of the Wisconsin Apprenticeship Law, placing apprenticeship under the jurisdiction of the Industrial Commission, and for the first time putting the impetus of legal status and administrative machinery behind the apprenticeship program in the state. The Wisconsin apprenticeship law established the principle that the state has a responsibility for the supervision of apprenticeship, to insure its being kept up to the standard established, and for the adjusting of differences between employer and apprentice.

Apprenticeship Prior to 1914

Let us look at the apprenticeship situation as it existed just prior to the opening of our twenty-five-year period. Until 1908, pressure for the development of apprenticeship — for definite agreements or arrangements that would insure orderly and progressive training in the skilled occupations — had come from two sources: namely, from certain enlightened trade unions and from certain enlightened employers. Its chief sponsors were the highly skilled trade unions and the large scale manufacturers.

A limited number of these employers set up a kind of apprentice training, employed special instructors to supervise the work of the apprentices in the shops, and gave apprentices regular classroom instruction in subjects essential to the industries concerned.

The report of the Committee on Industrial Education of the American Federation of Labor in 1912 took cognizance of these "corporation schools," and also called attention to the fact that considerable progress had been made within the preceding two or three years in "co-operative education"; that is, in the use of the public or private school for the supplemental training of apprentices. In this type of training, the school comes into the picture.

Some of the trade associations developed apprenticeship systems of their own which included standards for the employment of apprentices, and provided textbooks to cover their related instruction. These lacked administrative machinery for joint labor-management supervision and follow-up. During this period, however, several of the larger trade unions — notably the Pressmen's Union and the International Typographical Union — began to develop their apprenticeship systems which included correspondence-course lesson material and necessary regulations.

In 1916, the Conference Board on the Training of Apprentices — composed of the National Association of Manufacturers, the National Founders' Association, the National Metal Trades Association, the National Machine Tool Builders' Association, the United Typothetae and Franklin Clubs of America, and the American Foundrymen's Association — found that with few notable exceptions no regular system of apprenticeship was employed, no rules were followed nor agreements entered into in hiring and retaining apprentices, and no provision for their promotion in work experience or for their increase in pay existed. Apprentices were usually hired by foremen for their own departments, and the only training consisted of that which journeymen (from time to time as convenience permitted or necessity required) could give.

The General Apprenticeship Committee of the American Construction Council

The next milestone in apprenticeship was the appointment in 1920 by the American Construction Council of a General Apprenticeship Committee. The Council was a national body representative of all elements in the construction industry, including architects, engineers, construction labor, general contractors, subcontractors, material and equipment manufacturers, material and equipment dealers, financial, bond insurance, real estate, building and loan, chambers of commerce and boards of trade, construction departments of public utilities, officials of federal, state, municipal and county departments identified in any way with construction, national associations of builders exchanges and of building trades employers and similar associations or federations of building interests, and the public.

It was felt by the Council, that in order to promote in a broad and effective manner the idea of apprenticeship among all elements affecting the construction industry, and to secure the active and widespread support required to insure permanent results, national action would be required. It was also agreed that an adequate and efficient labor supply for the industry must be based upon national as well as individual local needs and resources.

The Hon. Franklin D. Roosevelt, who at that time was President of the Council, emphasized the Council's duty of "arousing the country to the need of placing skilled manual labor on a par with the clerical and nonmanual occupations in public esteem," and the necessity for "more appreciation of the dignity of craftsmanship." Thus it will be seen that in vision, in scope and in foreshadowing of the idea of national apprenticeship standards for the various trades, the American Construction Council's program of 1923 pointed to the need for a governmental agency to promote apprenticeship on a national basis and was a forerunner of the federal apprenticeship law enacted in 1937.

In 1924 the Associated General Contractors of America issued a report entitled, "Our National Construction Program and Its Need of Mechanics." The Bureau of Labor Statistics of the U. S. Department of Labor in 1928 surveyed the situation in the construction industry in nineteen cities through a pamphlet entitled "Apprenticeship in Building Construction" (Bulletin No. 459). The facts brought out in the survey highlighted the need for action on apprenticeship which would be national in scope.

The Federal Committee on Apprentice Training was set up under the N.R.A. in August, 1934, by the Secretary of Labor under authority of an Executive Order issued by the President. Its purpose was to permit the employment of apprentices under the N.R.A. codes, and to insure rounded development of skilled workers.

The Fitzgerald Act

With the passing of the N.R.A., apprenticeship was felt to be of sufficient importance to justify the continuance of the Federal Committee. Under an Executive Order issued in 1934, the Federal Committee continued as a separately functioning agency within the National Youth Administration. Meanwhile, it was becoming increasingly evident that the apprenticeship problem was not merely an emergency one, but involved a long-time program having important bearing on the future industrial picture. Pressure began to be exerted for passage of a federal law. The preliminary hearings before a Congressional subcommittee considering the Fitzgerald Bill, attested to the widespread approval and support of such legislation on the part of labor, of employers, and of agencies interested in the problems of youth. In August, 1937, the Fitzgerald Act was passed by Congress without a dissenting vote.

The Act authorizes and directs the Secretary of Labor "to formulate and promote the furtherance of labor standards necessary to safeguard the welfare of apprentices, to extend the application of such standards by encouraging the inclusion thereof in contracts of apprenticeship, *to bring together employers and labor for the formulation of programs of apprenticeship*, to co-operate with state agencies engaged in the formulation and promotion of standards of apprenticeship, and to co-operate with the National Youth Administration and with the Office of Education of the Department of the Interior. . . ."

Thus the furtherance of labor standards of apprenticeship was made a permanent responsibility of the U. S. Department of Labor, and the Secretary of Labor was authorized to appoint such national committees as were needed. The Federal Committee on Apprenticeship was subsequently designated as a continuing national committee. Its chief and staff were incorporated into the U. S. Department of Labor, and the Federal Committee was set

up as a separate service unit within the Division of Labor Standards.

In the year and a half since the passage of the Fitzgerald Act, the promotion of apprenticeship on a national basis has continued very much along the lines followed in the preceding three years. The Federal Committee on Apprenticeship has, however, worked more intensively on the promotion of national standards by trades than heretofore. In addition to the national plumbing, the national painting and decorating, and the national steamfitting standards already adopted, plans are under way whereby it is hoped that national apprenticeship standards will in time be formulated for all the building trades.

These national standards represent a trade's judgment and experience as to what constitutes the best preparation for its future skilled workers. They have been carefully worked out through negotiations between the national employers' and the national workers' organizations covering the particular trade or industry, and have been endorsed by the respective organizations at their annual conventions. The adoption of these standards and their application to apprenticeship in local communities should ultimately result in making future journeymen in a trade or industry uniformly competent in every section of the country.

State Apprenticeship Bills

It was long ago recognized that a successful national apprenticeship program would require active participation by the states, and that there was a need for state apprenticeship legislation. A representative committee was appointed in 1936 by the Third National Conference on Labor Legislation to draft Suggested Language for a State Voluntary Apprenticeship Bill. The bill suggested by the Committee provides for a program of voluntary apprenticeship under approved written agreements, but expressly states that higher apprenticeship standards entered into under collective bargaining agreements or the operation of apprentice training programs outside the act shall not in any way be affected. Since the apprenticeship to be developed under the Act is voluntary, the apprentice agreement constitutes the only statement of conditions of training and employment between employer and apprentice. The Suggested Bill therefore sets up certain standards and provisions to be incorporated in the agreement: the apprentice must be at least 16 years of age; the application of the apprenticeship program is limited to trades requiring at least 4,000 hours of training; the supplemental instruction in the school must be not less than 144 hours per year; the period of probation is limited to from 4 to 6 months; and the schedule of processes to be taught, the approximate length of time to be spent at each, and the wages to be paid must be specified in the agreement.

Since the legislation principally deals with the job aspects of apprenticeship, the Suggested State Apprenticeship Bill places the administration of the program in the state department of labor which supervises other employment standards. It directs the appointment of a State Director of Apprenticeship to work under the supervision of the Labor Commissioner, and provides for the establishment of a State Apprenticeship Council, to be composed in equal number of representatives of employers and of labor, as well as representatives of the public.

The State Apprenticeship Council's functions are to establish standards for apprentice agreements which shall in no case be lower than those prescribed by the state act, to issue such rules and regulations as may be necessary to carry out the intent and purpose of the act, and to perform such other duties as the Commissioner of Labor may direct. The State Apprenticeship Council is designated as the impartial agency to approve all apprentice agreements entered into within the state, and to adjust any differences that may arise between employer and apprentice.

The Suggested State Apprenticeship Bill also makes provision for the establishment of local and state joint apprenticeship committees for a trade or for a group of trades, such joint committees to be appointed from names submitted by the respective bona-fide organizations of employers and of employees in the trade. These joint committees, local and state, draw up suitable standards for the trade they represent as to the length of the apprenticeship, the processes to be taught, wage rates, ratio of apprentices to journeymen, and related questions — always, of course, conforming to the minimum basic standards set down in the state apprenticeship act.

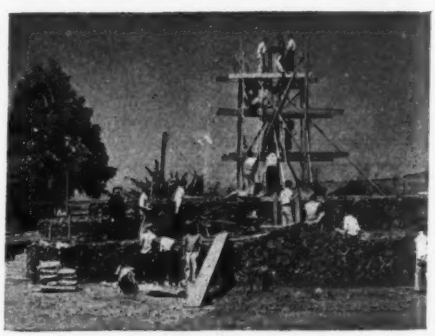
For the purpose of providing greater diversity of training or continuity of employment, the Suggested Bill also provides that the apprentice agreement may be entered into by an association of employers rather than an individual employer, or an organization of employees acting as the "employer's agent," whereby the association or organization agrees to use its best efforts to secure employment for the apprentice. Under such circumstances the apprentice may work for several employers, each of whom assumes full responsibility for the training of the apprentice during the time he employs him. It will be evident that this arrangement is particularly applicable to apprentices working for small employers or in the building trades. The Wisconsin Apprenticeship Act was amended in 1935 to include provision for such rotation of employment.

In 1937, Arkansas passed an apprenticeship law in conformity with the Suggested Bill, and in 1938, Virginia, Louisiana, and Massachusetts enacted apprenticeship legislation. Two states had previously passed apprenticeship laws: Wisconsin, as already pointed out, in 1915, and Oregon in 1931. Pending the passage of appropriate apprenticeship legislation, the following states have set up State Apprenticeship Councils: Kentucky (August, 1937); Indiana (May, 1937); Michigan (February, 1938); Connecticut (March, 1938); and Florida (November, 1938).

To bring the picture up to date, the first meeting of a recently appointed General Committee on Apprenticeship for the Construction Industry was held in Washington in March, 1938. The functions of this Committtee on Apprenticeship for the Construction Industry were stated as follows: "To advise the Federal Committee on Apprenticeship on all matters of a general nature affecting the construction industry . . . ; to render all possible aid to the Federal Committee in doing the job for which it was set up; to aid those elements within the construction industry who are unable to inaugurate an apprenticeship program of their own; and to publicize the idea of apprenticeship through trade papers, rotary clubs, chambers of commerce and other avenues open to employers so that public acceptance of the idea may ultimately result."

What of the Future

In concluding this discussion, I think it pertinent to make a forecast of what we may expect in the twenty-five years to come, insofar as apprenticeship is concerned — what the situation will be when, in 1964, INDUSTRIAL ARTS AND VOCATIONAL EDUCATION celebrates its golden jubilee. Looking ahead, therefore, one sees a network of national apprenticeship standards covering a greater and greater number of the recognized skilled trades. One sees the manual trades held in greater general esteem, and consonant with this increased dignity one sees greater opportunities opened up for young people to be apprenticed. One sees greater and greater co-operation between the school, industry, and the community, with ever increasing numbers of workers — both journeymen and apprentices — returning to school; the former in order to keep abreast of technological advance, the latter for their related supplemental instruction. One sees, too, as a result of this increased interest in and use of the school a distinctly enriching influence that should contribute to the reality of teaching methods.



Students erecting reinforced-concrete cross at Kalaheo Catholic Church, Kalaheo, Kauai, Hawaii. Ward Raymond, Instructor

Twenty-Five Years' Progress in Vocational Education

L. H. Dennis,

Executive Secretary,
American Vocational Association,
Washington, D. C.

A résumé of the development of vocational education since the beginning of this magazine.

It is manifestly impossible to do justice to so important and so comprehensive a topic within the limits of a brief article. It is only possible to refer to a few significant and outstanding phases of the developing program of vocational education throughout the United States.

The first thought that almost automatically flashes through one's mind when referring to vocational-education developments of recent years, is with reference to the remarkable growth in this type of educational service. From a relatively few communities in a handful of states, this program has expanded to the point where thousands of communities from one end of the country to the other are now offering one or many types of occupational training for the benefit of the youth of our land. This phase of the development of vocational education is in itself worthy of an extended treatment in any attempt historically to record the progress of vocational education in the United States through a quarter of a century.

While the expansion has been pronounced during this period, and particularly so during the last few years of the period, it is only a forerunner to the expansion which we are bound to witness during the years immediately ahead.

The developments of the last one fourth of a century have made America occupational-adjustment conscious. The interest in occupational-training opportunities on the part of both youth and adults has become almost universal. In many of our larger cities, the demand for vocational training has increased more rapidly than the facilities that have been developed in response to the demand. This is undoubtedly as it should be, for vocational training should be organized and carried on only after a thorough study has been made of the occupational trends and needs in those particular occupations for which vocational training has been requested or may be under consideration.

One of the contributions of the vocational-education efforts of recent years has been the clarifying of objectives and methods involved in a genuine program of occupational training. Vocational education has always been specific and definite in its aims and purposes. This has sometimes been misunderstood by those not familiar with the program. By some, vocational education has been considered narrow because it is specific and definite. This clarifying of objectives has been of greatest assistance in laying the groundwork for a better understanding of vocational education, its purposes and possibilities. This in itself is a development worthy of note.

It was quite natural that the early efforts in the field of vocational education should have been somewhat limited in scope and devoted to a few of the most common of the skilled trades. Training was first developed in and for those trades where the need for the same was most evident. In the early period of expansion, the development took the nature of duplication of the early forms of vocational education in additional communities.

The latter part of the period being treated by this brief statement has been marked by the widening of the program of vocational training by the addition of a great increase in the variety and types of occupations for which occupational training has been developed. This widening of the program will undoubtedly be very significant in the rapidly expanding program of the next few years.

In many communities, vocational education had its inception through efforts put forth to provide some type of educational activity that would assist in stabilizing overage and subnormal groups of adolescent youth. In some cases, it has taken a long period of years to outgrow this stigma or label that was early placed upon vocational education. It was rather common practice, for various reasons, to house the vocational-education quarters in the basement or in buildings unsuitable and unwanted for anything else. It is to the everlasting credit of the men and women teachers in our vocational-education programs that they have brought the program up out of the cellar because of the sheer worth of the program itself.

Vocational education has finally become respectable. In fact, in some few instances there is almost the danger that it might become highbrow, and the group of students originally served become forgotten in the efforts to serve youth of average ability and above. The program is finally emerging at the end of twenty-five years into a complex, comprehensive program, designed and operated to meet the occupational-training needs of three more or less distinct ability groups — the retarded or average group, the large average or above-average group, and those of greater ability who desire to prepare for the more highly skilled or semitechnical occupations. This conception of the entire program of vocational education is in itself one of the important outcomes of the twenty-five years of development.

During the early years of the period, and in fact until very recently, attention has been centered almost entirely upon the vocational-training aspects of the problem of occupational adjustment. A new conception of the whole scope of occupational adjustment has crystallized quite recently. The occupational-training or occupational-adjustment program is now coming to comprehend or include the entire program of genuine vocational guidance, occupational or vocational training, job placement, follow-up and retraining services. The development of an adequate and effective occupational-adjustment program involves more than vocational training itself. Furthermore, such a program will not be developed alone and independently by our leaders in public education. There are other public agencies that can and should be of assistance in the development of certain phases of some of the services involved in an occupational-adjustment program.

For those who have given of their time and energy during any portion or throughout the entire period of the past twenty-five years, there is much comfort and gratification because of the fact that vocational education is finally coming to be understood. It is no longer unpopular nor discredited. It is probably one of the most popular phases of public education throughout the nation. In its very popularity, however, there lies the danger that some hastily conceived programs of so-called vocational education will be undertaken and promoted with the resultant reaction which may here and there for a time bring some discredit to some portions of the program. For some of this, undoubtedly, the vocational-education leadership of this country will not be responsible.

While the great expansion, the widening diversity, and the increased popularity of vocational education are significant contributions of the past twenty-five years, probably the most valuable outcome of the efforts of these years lies in the fact that the groundwork and foundation has been laid for a substantial and thorough development of an effective program of occupational adjustment.

Don't worry and fret, fainthearted,
The chances have just begun,
For the best jobs haven't been started,
The best work hasn't been done.

— *Berton Braley.*

The Development of Industrial Arts in the Cincinnati Public Schools

Elmer W. Christy

Director of Industrial Arts, Cincinnati, Ohio

A brief historical sketch of the growth of industrial arts and vocational education in Cincinnati, Ohio

The Cincinnati public schools introduced manual training in 1905, nearly twenty years later than many other cities. In the beginning, our activities were limited to woodwork and correlated drawing in the seventh and eighth grades for ninety minutes per week. Further development in higher grades is coincident with the opening of two large cosmopolitan high schools in 1910, and the introduction of some nine or ten curriculums in one of which a unit of manual training was offered each of the four years. In other words, one fourth of the high-school program was devoted to manual training by those who chose to do so. Gradually, manual training was extended to lower levels until both the fifth and sixth grades were included.

The opening of our cosmopolitan high schools also marked the beginning of our technical-co-operative course in which the boys who elected it, completed four units of manual training in the first two years, and during the third and fourth years worked during alternate two-week periods in some manufacturing plant for a nominal wage. During the other two-week periods, these boys went to school for academic and related-subject programs. By including solid geometry as one elective, those who graduated were admitted to the engineering college of the University of Cincinnati.

In 1912, an effort was made to enrich the program of shopwork in the upper elementary-school grades, five to eight, by introducing other materials than wood, and seeking other values than tool skills alone. The natural interests of boys at these grade levels, rather than some vocational objective, were used as motivating forces. Several schools in our system contributed to this development. Particularly in our Oyler School shop Mr. Ray Kuns, now principal of our Automotive Vocational High School, introduced with great success many practices which are frequently advocated in current literature. These practices included the organization of whole classes of boys to work together on a multiple activity project. Furthermore, the division of labor organization which is so essential in industry, was employed with very satisfactory results in the school shop. For each class there was a boy superintendent, one or more boy foremen, boy inspectors, and boy accountants and stockkeepers.

Projects in which many boys worked together were undertaken only after the class had discussed their practicability and made their choice as a group. Those who preferred, were privileged to undertake individual projects. Because the boys participated so freely in planning and executing the plans, there was much opportunity for the exercise of initiative, resourcefulness, and economy. For example, material reclaimed from a near-by dump in a manufacturing section of the city, was transformed into serviceable wagons and scooters. Furniture was brought from home for repairs. Much of the school-shop equipment was made by the boys.

The Oyler and other similar school shops in our city were among the first to develop what are now called general shops. The type of general-shop organization started at that time, was based largely on boy interests. This practice still prevails in our schools in contrast to some modern general shops in which the routine is carefully planned and balanced so that each boy shall have the same experiences without regard to his aptitudes or interests.

During recent years, special emphasis has been given to the further enrichment of the industrial-arts program for boys in the seventh and eighth grades of elementary schools. In explaining this development, one needs to know that only about one half of the boys in these grades are enrolled in junior high schools. For the seventh- and eighth-grade boys in elementary schools, a reawakened interest in the general shop has developed a program with as many as eight or ten activities, in most of which one or more boys are always engaged. These activities include woodwork, metalwork, printing, electricity, handicrafts, shoe cobbling, clay modeling, fiber-furniture making, photography, and planning, including drawing.

We are now confronted with another problem of organization which may lead to a combined course in practical arts for both boys and girls in classes below the seventh grade, in place of the separate courses in household and industrial arts now offered. If this change is made, we hope that the time allotted to industrial arts in the seventh and eighth grades in elementary schools will be increased so as to more nearly approach the allotment in junior high schools. This would greatly improve the effectiveness of our general shops.

About 1915, there was a further extension of our school-shop program in secondary schools, largely in the form of new kinds of experience. Junior high schools were built. The name *manual training* gave way to *industrial arts* in recognition of the fact that school shopwork increasingly included the processes and materials used in industry. Sheet-metal work, printing, and electricity were introduced in both junior and senior high schools. Wood turning and forging as special subjects gradually disappeared, although they still occur incidentally.

Following the passage of the Smith-Hughes law, separate vocational schools were developed with the effect that the technical-co-operative course previously referred to was gradually displaced by the newer organization, and industrial arts became even more definitely a part of general education.

Coincident with the rapid increase in the enrollment in all high schools, and also with the development of separate vocational schools, it is interesting to note that the number of boys in our cosmopolitan high schools who elected industrial arts has continually increased since 1928. Not only has the *number* of boys increased but also the *percentage* of all boys in any one grade is larger. Between 1928 and 1934, industrial-arts enrollment in three large cosmopolitan schools increased as indicated in the following tabulation, in which the percentage represents that part of the total number of boys in the respective grades:

Ninth grade, from 20 per cent to 47 per cent.

Tenth grade, from 26 per cent to 32 per cent.

Eleventh grade, from 17 per cent to 25 per cent.

Twelfth grade, from 14 per cent to 22 per cent.

Since 1934, although the numbers have fluctuated from year to year, the trend is still upward. This increase in the number of boys choosing industrial arts as part of their high-school course is in keeping with the recognized importance of a diversified program of industrial experiences preceding the choice of a career either in professional or industrial life.

In secondary schools, we are at present endeavoring to meet the challenge of a changing social and industrial environment by emphasizing new values in our industrial-arts program without sacrificing the valuable parts inherent in the older practices. The gradual change from the discipline of manual training to the exploratory and social developmental values of industrial arts presents some difficult situations because of the danger of going too far in the new direction. It seems to be clearly our responsibility to arrive at some middle position between past practice on the one hand and theory on the other, to the end

that the experiences in our industrial-arts shops may help boys better to understand their industrial and social environment, and better to evaluate their own aptitudes for fitting into this environment. To limit our program to tool and machine-operating skills does not meet our responsibility, but to substitute reading, observation, discussion, and research for manipulative experiences, is just as futile. What we need to do is to combine manipulative experiences with reading, discussion, and research, because the handling of tools and materials provides an avenue to certain types of learning that can be acquired in no other way, while the more academic approach extends the horizon of related knowledge, skill, understanding, and appreciation.

Because boys are staying in school longer, due to their inability to secure employment under 18 years of age, our purpose is to extend the exploratory program begun in junior high school. So many new media and processes are being introduced in industry that there is no dearth of material for the development of a richer and broader program of industrial arts in secondary schools. In order that industrial-arts teachers may make the best use of this opportunity, we must discard the formal discipline of manual training, we must provide many new experiences in keeping with the ever-increasing complexity of industry, we must see that our boys are better informed about industrial affairs in general, and we must make the most of the opportunity which working in an industrial-arts shop provides for the development of fine social relationships, attitudes, and responsibilities. To these objectives we are directing our efforts with the sincere belief that industrial arts is destined to play an increasingly more important part in the expanding program of general education.

Predicting Trade-School Success—IV

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The fourth part of this study covers the relation of achievement in classwork to achievement in shopwork.

Relation of Achievement in Classwork to Achievement in Shopwork

It was found previously that the age and grade at which the boy entered the Clifford B. Connelley Vocational High School and his intelligence had something to do with his length of stay in the trade school and also with his success in shopwork.

Since intelligence is usually associated with achievement in classwork, and since intelligence was found in this study to be a factor of achievement in shopwork in the vocational high school, the next step in our examination of school records for factors predicting success in the school, is to determine what relationship exists between achievement in classwork and achievement in shopwork in the Clifford B. Connelley Vocational High School. While it is important to discover relationships between classwork and shopwork, within the school, such discovery by itself is not the best solution to the problem of selection for admission. The knowledge that classwork and shopwork correlate does not permit us to select boys before they have entered the vocational high school, but rather suggests a means by which a more economical tryout may be afforded.

The more predictive discernible factors which we are able to find before the boy enrolls in the Clifford B. Connelley Vocational High School, the better able we will be to select from the group of applicants, those boys who are most likely to succeed in trade work.

This examination of school-achievement records for relationship with achievement in shopwork was conducted in two ways:

1. Relationships within the Clifford B. Connelley Vocational High School: The relation between the boy's achievement records in classwork, both related and academic, and his achievement records in shopwork.

2. Relation of achievement in former school, elementary, junior high, or senior high, to achievement in the Clifford B. Connelley Vocational High School: The relation between the boy's former school-achievement records in both classwork and shopwork, and his achievement records in the Clifford B. Connelley Vocational High School in both class- and shopwork.

Relations within the Clifford B. Connelley Vocational High School

The questions considered in this part of the chapter are:

1. Is there any relation between the teachers' marks in the related subjects of mathematics, theory, and drawing and the teachers' marks in shopwork?

2. Is there any relation between the teachers' marks in the academic subjects of English, science, and mathematics and the teachers' marks in shopwork?

A General Statement Regarding Method

The relation between classwork and shopwork is treated by correlations and by tables of probability. Both of these methods use teachers' marks as a measure of success in classwork and in shopwork. The Pearson product moment method[24] was used for computing these correlations.

Relation of Achievement in the Related Subjects of Theory, Mathematics, and Drawing to Achievement in Shopwork

The courses of study in related subjects were developed through committees composed of teachers of related subjects and teachers of shopwork. These courses are based on the assumption that certain related information is essential to success in shopwork. To insure a closer relation between knowledge and skills, the related subjects are taught by teachers with experience in the trades related to the subjects which they are teaching.

TABLE XXIII

CORRELATIONS OF RELATED TEACHERS' MARKS IN THE SUBJECTS OF MATHEMATICS, THEORY, AND DRAWING WITH SHOP TEACHERS' MARKS

Shops	Related Math. r	Related Math. P.E.r	Rel. Theory r	Rel. Theory P.E.r	Rel. Drawing r	Rel. Drawing P.E.r	N
Auto Mechanic	.47	.032	.51	.031	.46	.033	254
Bricklaying	.42	.075	.48	.070	.37	.079	54
Cabinet Making	.50	.035	.43	.038	.60	.030	205
Carpentry	.40	.078	.32	.083	.65	.054	52
Commercial Art	X	X	.85	.025	X	X	56
Electric Wiring	.43	.046	.31	.051	.35	.049	143
Electric Power	.40	.038	.40	.038	.42	.037	217
Foundry	.43	.071	.50	.065	.46	.069	60
Machine	.33	.048	.35	.048	.42	.045	153
Pattern	.27	.025	.29	.014	.51	.068	53
Printing	.52	.039	.54	.038	.48	.041	156
Plumbing	.40	.073	.42	.070	.32	.077	62
Radio	.45	.061	.67	.042	.50	.058	77
Sheet Metal	.65	.041	.60	.045	.63	.042	90
Telephone	.38	.086	.62	.052	.44	.069	62
Drafting	.50	.041	.56	.042	X	X	118
Welding	.42	.069	.43	.068	.38	.071	65

Subjects marked with an "X" are not scheduled subjects.

[24] Hull, C. L., *Aptitude Testing*, World Book Company, New York, 1928.

The correlations of related subjects with shopwork shown in Table XXIII are positive and reliable, though not very high. However, they compare favorably with other relationship studies.

Ross[25] found English and arithmetic in grade school had correlations of +.34 and +.38 with first-year high-school mathematics.

Thorndike[26] found arithmetic had a correlation of +.68 with reading and with school progress of +.60.

From the correlations shown in Table XXIII certain administrative problems may be inferred. It may be that when theory is really a prerequisite to shop success, there will be a greater agreement in teachers' marks given to the boy in these two subjects. The extent to which teachers' marks in the related subjects should be considered by the co-ordinator in charge of employment when selecting boys for employment constitutes an administrative problem of importance. These problems will be discussed later.

Relation of Achievement in the Academic Subjects of English, Science, and Mathematics to Achievement in Shopwork

The courses of study in English, science, and mathematics were patterned somewhat along the same lines as the courses of study in the city high schools with modifications to meet the reduced amount of time devoted to these subjects in the vocational high school, and to meet the needs of the vocational-high-school boy. The more practical utility of these subjects is stressed.

The correlations of academic work and shopwork shown in Table XXIV vary considerably, but are all positive. Three of the correlations in science, six in English, and seven in mathematics are not reliable. The correlations of academic work with shopwork are not as high as the correlations of related subjects with shopwork.

An examination of Table XXIV shows:

1. That the correlation of teachers' marks in English with shop teachers' marks range from a low of +.01 in the foundry class to a high of +.44 in the printing class.

2. That the correlation of teachers' marks in science with shop teachers' marks range from a low of +.19 in the commercial-art class to a high of +.72 in the electric power class.

3. That the correlation of teachers' marks in mathematics with shop teachers' marks range from a low of +.03 in the foundry class to a high of +.51 in the cabinetmaking class.

These correlations may not tell the whole story of relationship between classwork and shopwork. Probability tables on relation of intelligence to teachers' marks in shopwork were found to show relationships that were not indicated in the size of the *r*. To investigate the possibility of using the probability tables in this part of the study, the data for the trade drafting class in mathematics were assembled in the form of a scatter diagram (Chart No. 4). The upper third and lower third of the class were ruled off to show the population in each of the three groups. We see from this chart a rather consistent agreement between teacher marks in shopwork, with teacher marks in mathematics in the upper and lower thirds. It is the middle third that causes low correlations. When these numbers in the upper, the middle, and the lower thirds of the distribution are changed to percentage and put into a probability table, the relation between success in classwork and success in shopwork is more apparent. Table XXV shows these relationships.

The trade drafting mathematics class was chosen as a sample for trying out this method of relationship because there is a general assumption in the drafting trade that mathematical ability is necessary for trade success, and because the correlation of .36 tends to contradict this assumption.

This table is read as follows:

A boy ranking in the upper, middle, or lower third of the distribution of teachers' marks in mathematics would have the following chances for being placed in trade drafting:

1. If he ranks in the upper third, his placement chances are: 72 in 100 in the upper third; 15 in 100 in the middle third; 13 in 100 in the lower third.

2. If he ranks in the middle third, his placement chances are: 23 in 100 in the upper third; 51 in 100 in the middle third; 26 in 100 in the lower third.

3. If he ranks in the lower third, his placement chances are: 5 in 100 in the upper third; 33 in 100 in the middle third; 62 in 100 in the lower third.

It would probably be better if teachers' marks were given in thirds, but since teachers' marks on transcript records use the five-point rating scale of A-B-C-D-E,

[25] Ross, *op. cit.*
[26] Thorndike, *op. cit.*

TABLE XXIV

CORRELATIONS OF SHOP TEACHERS' MARKS WITH ACADEMIC TEACHERS' MARKS IN THE SUBJECTS OF ENGLISH, SCIENCE, AND MATHEMATICS (ALGEBRA, GEOMETRY, TRIGONOMETRY)

Shops	*Science* r	*Science* P.E.r	*English* r	*English* P.E.r	*Mathematics* r	*Mathematics* P.E.r	*N*
Auto Mechanic	.29	.038	.35	.037	.40	.035	254
Bricklaying	.41	.076	.34	.081	.26*	.085	54
Cabinet Making	.46	.037	.41	.039	.51	.034	205
Carpentry	.44	.075	.21*	.088	.38	.080	52
Commercial Art	.19*	.087	.20*	.086	.21*	.084	56
Electric Wiring	.50	.042	.35	049	.46	.043	143
Electric Power	.72	.022	.28	042	.45	.036	217
Foundry	.34	.077	.01*	.087	.03*	.087	60
Machine	.31	.021	.44	043	.45	.043	153
Pattern	.32*	.083	.23*	.087	.25*	.086	53
Printing	.36	.047	.44	043	.32	.048	156
Plumbing	.45	.068	.27*	.079	.27*	.079	62
Radio	.38	.066	.34	.068	.19*	.074	77
Sheet Metal	.26	.063	.34	.062	.39	.060	90
Telephone	.23*	.082	.22*	.081	.37	.074	62
Drafting	.29	.056	.29	.056	.36	.054	118
Welding	.39	.071	.42	.069	.16*	.081	65

*These correlations are not reliable.

TABLE XXV

CHANCES FOR PLACEMENT IN THE UPPER, MIDDLE, OR LOWER THIRDS OF THE SHOP TEACHERS' MARKS OF BOYS WHO ARE IN THE UPPER, MIDDLE, OR LOWER THIRDS OF THE MATHEMATICS TEACHERS' MARKS IN THE TRADE SCHOOL

Distribution of Trade Drafting Teachers' Marks	*Teachers' Marks in Mathematics* Upper Third %	N	Middle Third %	N	Lower Third %	N	*Total*
Upper Third	71.8	28	23.0	9	5.1	2	39
Middle Third	15.3	6	51.2	20	33.3	13	39
Lower Third	12.8	5	25.7	10	61.5	24	39
Total		39		39		39	117

TABLE XXVIa

CHANCES FOR PLACEMENT AT END OF FIRST SEMESTER IN UPPER, MIDDLE, OR LOWER THIRDS OF TRADE SCHOOL SHOP TEACHERS' MARKS IN THE COMBINED TRADES, OF BOYS WHO HAVE EARNED VARIOUS MARKS IN THE COMBINED SUBJECTS OF ENGLISH, SCIENCE, AND MATHEMATICS IN THE TRADE SCHOOL

		Combined Academic Marks 3.00 and above		2.50 and above		2.00 above		Below 2.00		
	Groups	%	N	%	N*	%	N*	%	N	*Total*
Shop Teachers' Marks	Upper	61.5	147	52.4	321	41.3	494	19.3	130	624
	Middle	26.3	63	31.7	194	34.1	409	31.8	215	624
	Lower	12.2	29	15.9	98	24.6	293	48.9	331	624
	Total	100	239	100	613	100	1196	100	676	1872

*These are cumulative numbers.

TABLE XXVIb

CHANCES FOR PLACEMENT AT END OF THIRD SEMESTER IN UPPER, MIDDLE, OR LOWER THIRDS OF TRADE SCHOOL SHOP TEACHERS' MARKS IN THE COMBINED TRADES, OF BOYS WHO HAVE EARNED VARIOUS MARKS IN THE COMBINED SUBJECTS OF ENGLISH, SCIENCE, AND MATHEMATICS IN THE TRADE SCHOOL

		Combined Academic Marks 3.00 and above		2.50 and above		2.00 and above		Below 2.00		
	Groups	%	N	%	N*	%	N*	%	N	*Total*
Shop Teachers' Marks	Upper	56.6	60	46.9	144	39.6	220	18.1	42	262
	Middle	33.0	35	32.2	99	34.4	191	31.1	72	263
	Lower	10.3	11	20.8	64	25.9	144	50.8	118	262
	Total	106		307		555		232		787

*These are cumulative numbers
†Teachers' Marks A=4, B=3, C=2, D=1, E=0.

and never distinguish the pupils as being in certain thirds of the class, the average of teachers' marks is used in place of the thirds of the distribution. The A-B-C-D-E ratings were transmuted to 4-3-2-1-0.

Tables XXVIa and XXVIb show the same relationship for the combined trades, and are typical of the relations shown in the individual trades, namely, that success in classwork predicts success in shopwork. The following explanation will help the reader interpret these probability tables.

The shop teachers' marks are divided into thirds. These divisions are based on teachers' marks in shopwork and are shown on the left side of the table. The averages of the teachers' marks in English, science, and mathematics are shown at the top of the table. The number of cases in each classification is shown by the letter *N*.

Summary of Findings

1. The size of the correlation coefficient conceals factors of predictive value.

2. The same data arranged in a scatter diagram for the trade drafting group shows that over 70 per cent of those in the upper third of the shop group make the higher marks in classwork, and that over 60 per cent of those in the lower third of the shop group make the lower marks in classwork. Only 51 per cent in the middle third of the shop distribution rank in the middle third of the class distribution. This shows a boy in the middle third of the shop group may be found in any third of the class group.

It may be inferred from these findings that to be in trade drafting, a minimum amount of mathematical ability must exist. The reverse of this, however, does not hold. Ability in mathematics does not presuppose ability in drawing.

The scatter diagram was made only for trade drafting; this relation may be true for other shops.

3. The correlations between shop and academic subjects are all positive and reliable.

4. The correlations between shop and academic subjects are all positive, but not all reliable. Of seventeen correlations in science, three were not reliable; of seventeen correlations in mathematics, seven were not reliable; and of seventeen correlations in English, six were not reliable.

5. The relationship between the combined averages in English, science, and mathematics with shopwork is more clearly established when shown in a probability table. This relationship expressed in terms of chances shows that at the end of the third semester a boy making an average teacher mark of B or better in the combined subjects of English, science, and mathematics, will have the following chances for placement: 57 in 100 that he will be placed in the upper third of the shop distribution; 33 in 100, in the middle third; and 10 in 100, in the lower third. If the mark is below C, his chances are 18 in 100 that he will be placed in the upper third; 31 in 100, in the middle third; and 51 in 100, in the lower third. These relationships between success in classwork with success in shopwork, imply that for purposes of selection, preference should be given to those boys with higher marks in classroom subjects.

6. The agreement between teachers' marks in academic subjects and teachers' marks in each of the seventeen shops, with the exception of the foundry and plumbing shops, is strengthened when the same agreement is again found at the end of the third semester. This consistency of agreement between teachers' marks at the end of one semester in training and again at the end of the third semester, tends to justify the use of teachers' marks as a basis for prediction. It shows no large error is caused in this study by using first-semester marks rather than later marks. The advantage of studying first-semester marks lies in the greater reliability from the study of greater numbers.

(To be continued)

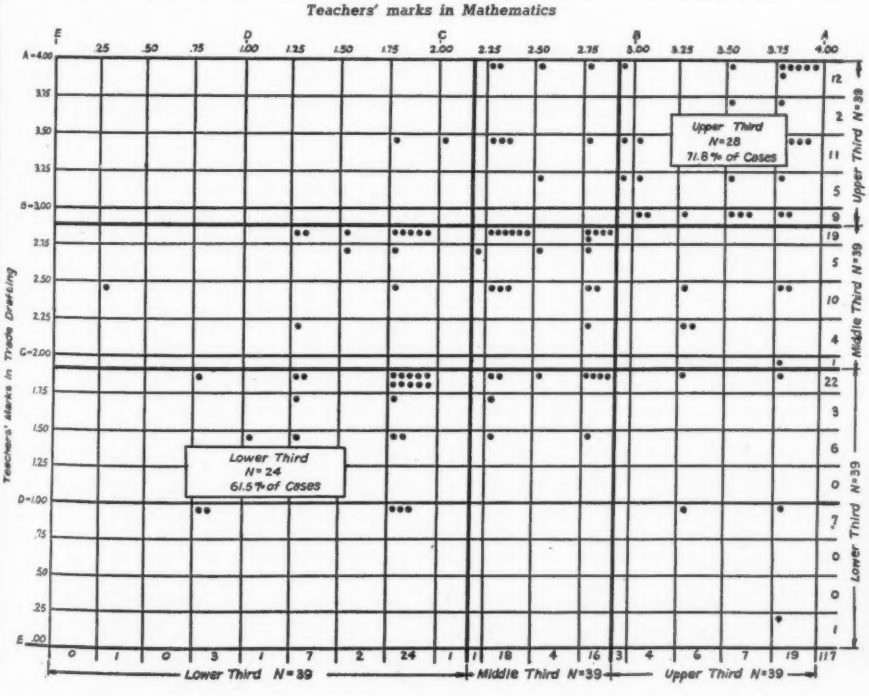

Chart No. 4. Scatter diagram showing relation of mathematics teachers' marks to trade drafting teachers' marks

AN INDUSTRIAL-ARTS TEACHER'S APPEAL

Fred C. Finsterbach, South Park High School, Buffalo, New York

To All Teachers of All Grades:

The industrial-arts department is putting on a campaign to eradicate the use of the obsolete term *manual training* and is asking the assistance of all.

This is not a matter of being *high hat* about the work fostered by the industrial-arts department, but of appealing for the use of terminology appropriate to the activity and in accord with advanced educational theory.

The work known as *manual training* has been out of existence in this school system and elsewhere for nearly fifteen years. In its place we find a broader, more comprehensive type known as *industrial arts*.

In brief, this newer work is a study of:

1. The changes that man makes in materials to meet his needs.

2. The proper use and value of the products made.

3. The social advantages and problems resulting from the making of these changes and products.

The new form aims at *industrial intelligence* for every boy, whereas the old form consisted merely of repetitive exercises in woodwork calculated to develop hand skill.

The term *industrial arts* is well known to the children, but they appear to be confused by hearing the teachers refer to the work as *manual training*. No doubt, those who use the wrong term do so more through force of habit than lack of information, but the *children do not* have the background possessed by the teachers.

The industrial-arts department would be very pleased if the lower-grade teachers would make appropriate explanations to their classes, and follow this by a visit to the shop. The upper-grade teachers could help by posting a notice on the blackboard announcing the day and period that the boys are to go to *industrial arts*.

All teachers are cordially invited to visit the shop at any time. Classes may make a tour of the shop during the fifth period on Tuesdays or Fridays. Co-operation with the industrial-arts department will be greatly appreciated.

A planer job. David Ranken, Jr., School of Mechanical Trades, St. Louis, Mo.

INDUSTRIAL ARTS *and* VOCATIONAL EDUCATION

J. J. Metz, Editor

A Quarter Century

Viewed from the editorial chair, it is interesting to raise the question, "Just what has the passage of 25 years done to INDUSTRIAL ARTS AND VOCATIONAL EDUCATION?" Of course, it occurs to one at once that the magazine must have contributed something not only to exist for the span of a quarter of a century, but to command the respect of a continually growing number of those whose interests and labors lie in the sphere of practical education.

The passage of time is, of course, an inexorable dictum of Providence, and lies beyond the power of man to change. The questions, therefore, arise: "What has the magazine done with the opportunity which was extended to it during the past quarter century? Has it something worth while to show for its existence? Has it added to the sum total of the mass of knowledge which has been stored up in the professional literature by those interested in the fields of education for which INDUSTRIAL ARTS AND VOCATIONAL EDUCATION stands? Has the magazine attracted capable men to contribute to its pages? How well has it helped to spread the gospel of industrial arts and vocational education? How well has it covered the field? Has it given aid alike to the beginner and to the veteran in the field?"

One could go on at great length adding to this list of questions, but both time and space forbid this. It may suffice to take the questions listed and see just how INDUSTRIAL ARTS AND VOCATIONAL EDUCATION has taken care of its particular duties during the quarter century during which it has been in existence.

There were 298 numbers of the magazine issued since its first appearance in January, 1914. Each one of these had from 35 to 40 pages of editorial material. The type size of the pages varied from 6¾ by 10 inches to 7 by 10⅜ inches which is its present size. Looking at it, then, from the viewpoint of printed matter given to the reader during 25 years, we find that it totals up to more than 827,000 square inches.

The usual 6 by 9-inch professional book contains approximately 28.5 square inches of type material per page. INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, then, during its existence of 25 years, has published material that was helpful to the teachers of practical subjects, equivalent to 29,000 pages of such a book or to ninety-seven 6 by 9-in. books containing 300 pages each.

There are those, of course, who may object to the application of the term "professional" to the problems and projects which have been a part of practically every issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION since the first number was printed. Even then the magazine has the right to make the claim that the professional material which it has furnished during its existence is easily equivalent to 40–50 per cent of the total amount of the editorial material which has appeared in its pages. Converting it again into 6 by 9-inch books of 300 pages, the publishers of this magazine may proudly claim that it furnished its readers professional material equivalent to at least 44 of these books.

Besides this, there has been the equivalent of upward of 50 of these books on problems and projects which could be directly used in the classroom. There were also many helpful hints on how to circumvent troublesome problems arising in the school shop, and jigs, kinks, special methods, and handy formulas that have been found useful by the ingenious teachers who had first tried them out.

A cursory glance through the 25 volumes of the magazine that have been issued, shows the wide spread of the interests that have been served. There are the articles written by teachers from the elementary school, the junior high, the part-time and and full-time vocational schools, and from the teacher-training institutions. The professional articles cover the full gamut from the administrative, policy-setting, supervisory articles down to those which discuss the philosophy and objectives of our work, methods, classroom management, discipline, methods of grading and recording, of carrying on research problems, of analyzing subject matter, and of providing suitable instructional material. The practical-subject areas covered also are numerous and wide, and the list of authors shows that practically every type of public and private school offering industrial arts and vocational education is represented and that men from nearly every state in the Union, the United States Possessions, and from Canada, England, and Scotland have contributed to its pages.

Naturally, INDUSTRIAL ARTS AND VOCATIONAL EDUCATION feels proud of what it has contributed, but it prizes still more highly the fact that it has made thousands of friends; that its readers are scattered widely not only throughout our own country, but far beyond into many foreign countries as well; that it serves beginners in the shop teaching field as well as those who have grown old in service; that professional writers frequently quote from its pages; that its authors are drawn from every teaching and educational administration level in our country.

On this, our 25th anniversary, then, we look backward with what we hope is pardonable pride. For the future we promise continued effort at ever greater service. We sincerely thank all our friends for helping us to progress in the past and we bespeak the continuance of their good will and assistance for the future.

Industrial Arts for the Girls

The experiment of admitting girl students into the school shop has been tried successfully in many school systems. The practice is not so common as it ought to be, however, and teachers in schools where this idea has not been tried out, have every reason to study this particular method of broadening the field of their work.

A number of the objectives set up for giving industrial-arts work to the boys are just as valid when applied to the girls. The girls, too, live in this mechanical age and in their hands rests much of the selecting, purchasing, and operatively using the products of this age. It remains, then, to work out the details for making industrial-arts work available to these future potential consumers. Whatever changes, if any, will be needed in the outline of the industrial-arts course as given, will then have to be determined and made.

For those interested in giving this phase of industrial-arts work serious study and consideration, the article entitled "Girls and Their Education" by L. H. Harnsberger which appeared on page 335 in the October, 1937, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION will be helpful.

Incidentally, the guidance phase of industrial-arts work for the girls should not be overlooked either, and the shop teacher who is preparing to extend his work to take in the girls will do well to refer to I. M. Fenn's article entitled "Industrial Arts, Household Arts, and Occupational Information," on page 373 of the November, 1937, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION. Louis F. Barocci's article on "Vocational and Educational Guidance Opportunities Inherent in Industrial Arts," on page 371 of the same issue, and "Obtaining Occupational Information," by Clifford K. Lush, on page 278 of the September, 1938, number, will also be found helpful.

It is important in this day, when men and women so often share the same type of work in office, factory, and store, that the practical education and its vocational-guidance values for the girl of tomorrow be not overlooked. It presents a real problem and an opportunity, and instructors, supervisors, and directors of industrial-arts work must work co-operatively on its solution. If this is done on a large scale, the good work now done by some school systems will be multiplied and the benefits of the work now offered only to boys, in all too many communities, will be opened up also to the girls of our country.

Shop Budgets and the Shop Library

Shop teachers have been long accustomed to making out budgets and requisitions for tools, materials, equipment, and the like. The need for these things in the school shop has gradually become recognized by school administrators as a recurring item which must not only be expected but also attended to.

Shop libraries, however, are all too frequently still looked upon as something distinct and separate, yes, as something extraneous to shop matters. Unfortunately, too many shop teachers look upon books from this same viewpoint, forgetting that books have become a real necessity in the modern school shop. Many of them have learned that books make the teaching job much easier and permit instructions to be given much more efficiently, but they have not succeeded in overcoming the habit of considering the shop library an adjunct rather than a necessity. Their budgets and requisitions, therefore, still put the books into painfully apparent isolation.

The past has shown how difficult it was to establish the necessity of making additions and renewals to the tools and equipment of the school shop. No doubt, it will be equally troublesome to show the necessity of adding to or renewing the books which compose the shop library. To accomplish this result will require, first of all, a change of attitude on the part of the teachers themselves. They know, of course, that books are as necessary in the modern school shop as are the tools and the other equipment, but they must first habituate themselves to treat books that way on their requisitions and in their budgets.

It will naturally take time to put this idea across with administrators and others whose duty it is to make school-shop purchases, but until it is done, shop teachers who cannot get the books which they need will be seriously handicapped.

Peace on Earth

It is quite curious, but very human, that, as the world is preparing to celebrate that centuries-old feast of Christmas, commemorating the birth of Christ, the Prince of Peace and Good Will, that mankind should be slowly but surely drifting toward another cataclysmic war.

The war clouds which are hovering so near to the horizon threaten to become still darker and it seems very likely that the fury of war, the suffering, and the privations that inevitably accompany war will soon be with us again.

With all the educational advances that have been made in the past centuries, man has not yet learned the absolute futility of war. In spite of the lesson of love that was taught us by the Master Teacher almost 2,000 years ago, we are savages at heart. The lesson of peace on earth which He tried so hard to instill seemingly was presented to minds incapable of grasping it.

Large governments, without let or hindrance, assume authority over smaller nations. By secret scheming and plotting, the larger countries are jockeying for positions of power. Rulers are ruthlessly assuming authority which deprives large numbers of their subjects of rights which most certainly should belong to every individual. Minorities impose their wills on others less well organized, and conscience seems to have ceased to function in nations and individuals alike. Men who have lived and worked together for years suddenly look upon one another with suspicious eyes. Past favors are forgotten, and frequently fancied wrongs, invented for the occasion, are used as arguments to foment hatred and arouse ill will. In an attempt to vent their spleen, misguided or unprincipaled individuals shortsightedly demolish the very tools and machines with which they have earned their income in the past and will certainly have to do so if they want to earn a livelihood in the future.

What are we as educators doing to correct these conditions? Are we, too, working only for our own advancement, forgetting the purpose for which the leadership of youth has been entrusted to us?

These are serious questions. We must individually answer them.

The Turn of the Year

As this issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION reaches its readers, the year 1938 is slowly but surely approaching its end. Time is forever on the move, and hardly will the clock have ticked off the old year before we will begin to approach the end of the year 1939.

As is customary between friends, INDUSTRIAL ARTS AND VOCATIONAL EDUCATION wishes its readers a most Happy New Year. It also dares to call attention to the old, old custom of looking back over the old year with an appraising eye to see what has been accomplished, what part of the work has been satisfactory, which portions of it need revision and upgrading, what new things are to be added, and how to make the entire effort more efficient and satisfactory.

It is easy, of course, to make plans for 1939. It takes effort, however, to put the changes decided upon into practice. It is only by strongly adhering to the plan outlined, that it is possible to achieve real betterment and success.

Professional improvement does not necessarily mean earning credits toward a higher degree. It also means learning to do a better job right on the job. This is what the new year invites one to do, and INDUSTRIAL ARTS AND VOCATIONAL EDUCATION wishes its readers strength and much success in bringing about changes which are so necessary to improve the teacher himself and the subject which he teaches.

Study of Traffic Safety—II

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(Concluded from page 426, December, 1938, issue)

The Preparation of Teachers

In order to determine just what the various state teacher-training institutions were doing in the way of preparing their students for teaching safety in the public schools, a study of the catalogs of 164 institutions in 43 states was made.

An inspection of all the departments was first made to allocate all courses in any kind of safety education. This revealed that only two departments were working in the field, namely: the industrial-arts and the physical-education departments. In some institutions, safety work was being conducted by a department of health. In none of those cases, however, was it clear that the department was entirely divorced from the physical-education department so, as a matter of convenience, no distinction was made for those cases, and all were incorporated in the physical-education department.

After the work was definitely allocated in those two departments, the next step was to inspect the various course descriptions to see which courses covered safety, and to determine the nature and extent of the work done.

Only 100 out of the 164 schools offered work in industrial arts. Where safety work of the nature being inspected was offered, it was confined to the logical branch — some phase of automotive work. To get a clear picture then, the field of industrial arts was broken down and considered as follows:

1. Does the school offer work in industrial arts?

2. Does the department offer automotive work?

a) Is safety work of a general nature offered?

b) Is training in traffic safety offered?

Since all schools offered work of some nature in the field of physical education, the field was broken down and considered as follows:

1. Does the department offer work in general safety?

2. Does the department offer work in traffic safety?

The above questions are answered only by the words "yes" and "no." The following summary gives more complete information about specific cases.

Summary of Findings

In Industrial Arts

1. In only two institutions are courses designed specifically for the training of teachers in traffic safety offered.

a) Nebraska State Teachers College, at Kearney, offers a complete course which covers a study of accident causes, a study of the automobile, and the operation of the automobile.

b) State Teachers College, Santa Barbara, Calif., offers a course which covers the design, manufacture, and proper use of the car.

c) Western State Teachers College, Kalamazoo, Mich., on September 19, 1937, had the following announcement published in the newspapers of the middle west. "Prospective teachers attending the Western State Teachers College this year are offered a course in traffic safety and automobile operation. This is the first college in Michigan, and one of the few in the nation to offer such a course.

"Teachers, having completed the course, will be prepared to train youngsters to drive carefully, it was pointed out by Elmer C. Weaver, instructor in industrial arts, who will be in charge.

"Means of prevention of accidents and a study of accidents, courtesy, and traffic laws will be given with dual control automobiles which have been purchased by the college."[10]

The college catalog for 1937–38 makes no announcement of this offering. Apparently the decision to include this course in the industrial-arts curriculum of that institution was reached shortly before the opening of the school year. This announcement places three schools in the group with a definite offering of traffic-safety education.

2. In two institutions work is offered from an engineering point of view. The engineering aspect of the work is emphasized so that one may reasonably doubt the extent of traffic safety from a teacher-training point of view.

a) Fresno (California) State College offers work in engineering and the course deals chiefly with surveying and the study of highway and railroad curves.

b) Colorado State College, at Ft. Collins, offers a course in the study of highway traffic control on an engineering bases.

3. In two institutions, in a general course in automotives, one unit of the course is devoted to traffic safety.

a) Northeastern Oklahoma State Teachers College, at Talequah, has such an offering.

b) Teachers College of Connecticut, at New Britain, offers a course that deals primarily with the upkeep of the car with some attention given to the use of the car. It is assumed that traffic safety would enter into this unit.

In Physical Education

In most institutions where safety courses are offered, they are of a general nature. Many of the schools offer work in first aid. Since the courses are offered in the athletic department, the work, in most cases deals with the treatment of athletic injuries.

In three institutions, some work in traffic safety is offered, dealing chiefly with first-aid treatment for the injured.

1. Ball State Teachers College, at Muncie, Ind.

2. Ft. Hays State Teachers College, at Ft. Hays, Kans.

3. Eastern Kentucky State Teachers College, at Richmond.

What Shall the Teacher-Training Course Include

It seems to the writer that the course in traffic safety should not be identified with any one particular department. If our aim is to teach all youngsters how to drive an automobile, we tend to defeat our purpose by placing the course in traffic safety in the industrial-arts, physical-education, social-science, mathematics, or English department. Students too often carry prejudices for certain subjects and, if the traffic-safety course is not required, some will avoid it because of distasteful associations. They may feel that emphasis of the particular subject, with which it is identified, will be stressed and, while their interest in the safe-driving course may be high because of their desire to drive an automobile, lack of ability or interest in the other field will keep them away. Teacher qualifications may demand that the industrial-arts teacher, or the physical-education teacher, or any of the others must teach the course, but care should be taken not to identify the work with another subject.

Some of the first qualities of a good teacher of driving safety must have are:

1. *A Belief in the Need and Value of the Work.* Strange as it may seem, driving safety is something that is thought of as being valuable to the other fellow. Most of us are gamblers at heart. We believe these accidents can't happen to us. A teacher who goes at this job of teaching half-heartedly will get very little in return of a positive nature. More than likely, his students will soon sense his lack of earnestness and the results of such teaching will be worse than no teaching at all.

[10] *Chicago Tribune*, Sept. 20, 1937.

2. *Patience with the Learner.* Much of the work in teaching a new driver is individual in nature. Individual differences come to light in their most extreme forms in this business of learning to drive. An impatient teacher can very easily discourage the youngster that is slow in picking up the techniques of driving. For many youngsters, who are learning to drive, the skills come easily. The development of good driver attitudes often becomes a difficult task. It is ridiculous to believe that a teacher without patience could do much in the way of developing good driver attitudes.

3. *Initiative.* The teacher of this work must know that he will not start and stop with the school bell. Since much of the work is individual in nature, he must be willing to follow a schedule that may keep him busy all day long. There are many phases of the work that vary from place to place and the teacher must work out many of these problems himself. The road instruction is different from most school subjects in that much of it is done with the people of the community as an audience. Mistakes are not covered up by the four walls of the school building. So far, it has been the aim of the leaders in the field, that the work of the classroom will be stimulated by individual interests. It is not advisable to kill the subject with reading assignments. Excellent results can be accomplished through activities, and once these activities are started, assignments can be forgotten. High-school pupils will read more of the very interesting material on the automobile, the driver, driving techniques, and related subjects than any teacher would think of assigning. It becomes the duty of the teacher to steer these interests along profitable channels. That takes initiative.

The foregoing three qualities are not the only ones needed, for the teacher who offers a traffic-safety course also must possess all the qualities that are desired of teachers. The teacher who is to present this work, however, must possess the three qualities that were mentioned because the lack of any one of them means certain failure. The prospective teacher who possesses them is now ready for instruction.

It has been stated that the course for high-school youngsters should be based on individual interest, and that these interests vary widely; so also, any course for the preparation of teachers should take this fact into consideration, since most of us teach as we are taught rather than as we are taught to teach.

The following course is presented in skeleton form because of space limitations. When this course, which has been built up to include those principles of individual interest, has been developed by a class of prospective teachers, they will have a working manual embodying the right philosophy, plus a well-rounded background of information, and a long list of activities. The teacher is then prepared to select from this list those activities which fit individual needs and promote study along desired lines.

Unit I. The Driver: His Psychophysical Qualifications

1. What are the visual limitations of the driver?
2. What is the relationship between intellectual capacity and good driving?
3. What is the relation of emotional balance and safe driving?
4. The neuromuscular capacities of the driver.
5. Devices for measuring sensory defects of drivers.
6. Devices for measuring intellectual capacities of drivers.
7. Devices for measuring emotional balance of drivers.
8. Determining the statistical significance of these tests.
9. Measuring one's qualifications as a driver.
10. Determining what and how changes occur in a driver's capacity.
11. Developing a check system for comparing one's self with others as a safe driver.
12. Developing and clarifying the concept of compensation as applied to safe driving.
13. Determining ways of correcting deficiencies.
14. Devising ways of self-improvement for the learner.
15. Determining the most important cues relating to deficiencies of other drivers as they affect performance.
16. Determining ways of avoiding accidents caused by the other driver.

Unit II. The Driver: His Attitudes and Responsibilities

1. The influence of personality upon safe driving.
2. The influence of physical and mental states upon driving.
3. The influence of stimulants and sedatives upon driving.
4. Driving is a privilege.
5. Consideration for other drivers.
6. Consideration for the pedestrian.
7. "It is smart to be safe."
8. Satisfactions that come from safe driving.
9. Improper attitudes and efficiency of traffic flow.
10. Improper attitudes and driving strain.
11. Improper attitudes and accidents.
12. Social responsibilities of the driver.
13. Legal responsibilities of the driver.

Unit III. The Pedestrian and His Responsibilities

1. Pedestrian problem of today compared with twenty years ago.
2. Physical relationship of the automobile and pedestrian.
3. Pedestrian problems of the city.
4. Pedestrian problem of rural areas.
5. Physical defects that affect safety of pedestrian.
6. Legal rights, privileges and obligations of the pedestrian.
7. Value of proper pedestrian attitudes.

Unit IV. Sound Driving Practice and Rules of the Road

1. Need and value of checking the car.
2. What are the good habits of driving?
3. Develop good habits of driving.
4. Advantages of skillful control of car.
5. How does courtesy affect driving?
6. Need and value of proper hand signals.
7. What are the accepted hand signals?
8. What is the effect of show-off driving on riding comfort?
9. What is the effect of show-off driving on safety?
10. What is the effect of show-off driving on the car?
11. What are the local traffic regulations? State? National?
12. Driving is a full-time job.
13. What is a foolish chance?
14. Wise choice of speed.
15. Causes of accidents.
16. Dangers of excessive speed.
17. Determining rate of acceleration.
18. Determining braking efficiency.
19. Determining maximum cruising efficiency.
20. Determine distances with reference to speed.
21. Determining distances required to stop with reference to speed.
22. Determining ability to control car under adverse conditions.

Unit V. The Automobile: Construction, Care, and Maintenance

1. What are the safety aids in the driver's compartment?
2. What are the gauges in the driver's compartment?
3. What are the starting devices in the driver's compartment?
4. What are the control devices in the driver's compartment?
5. What are the state requirements with regard to equipment of the car?
6. What are the mechanical features of the automobile with which the driver should be familiar?
7. What are the devices used to test mechanical and safety features of the car?
8. Developing respect for proper care and maintenance of the automobile.
9. How do mechanical features enter into accident causes?
10. What are the compensations for and corrections of various mechanical deficiencies?
11. How to know common troubles by their symptoms.

Unit VI. Highways and Transportation

1. Development of transportation in America.
2. Growth of motor-vehicle transportation in America.
3. What are the various types of highways?
4. What are the effects of weather conditions on the different types of highways?

5. What is the importance of highway maintenance?

Unit VII. Learning to Drive

1. Values of learning to drive under expert guidance.
2. Knowledge of operation of mechanical devices used in operation.
3. Operations necessary for efficient, safe driving.
4. Place of attitudes in efficient, safe driving.

Unit VIII. Improving Traffic Control

1. Need for improvement of traffic control.
2. What are the ways of improving traffic control?
3. Responsibilities of individual in traffic control.

Road Instruction. There are differences of opinion on when the road instruction should be given with reference to the classroom instruction, how much time should be given over to road instruction, and the nature of the road instruction that is to be given.

Those of us in industrial arts have long known the value of activity in instruction. We have learned that the sooner we can get our classes at the thing they come there to get, the more successful will be our teaching. These youngsters come to the industrial-arts classes to do something; to make something that is theirs. Likewise, with the course in driver training. These youngsters come to us because they want to learn to drive an automobile and it seems necessary that road instruction should parallel classroom instruction. The sooner the automobile can be used, the easier and more successful will be the work of the teacher.

The amount of road instruction varies with the pupil, the instructor, and the conditions under which this instruction is given. As yet there are few who will venture to set a definite time allowance for the complete training of a safe driver. Studies are being made that should give us this information when they are completed. Most people today hold to the belief that each pupil should have a minimum of thirty hours behind the wheel.

The nature of the instruction varies from the use of dummy cars to the complete training in a dual-control car. The proponents of the different methods all swear by their own systems and so long as their results are good, it is foolish to argue the matter. It seems, however, that natural conditions are superior to artificial ones and should be used whenever possible.

The use of the dual-control car is today considered by most persons as the ideal way to conduct road instruction. Where this type of instruction is possible, Stack recommends the following procedure. "The principal or teacher selects the group and a schedule is arranged for pupils to practice during free periods. In a normal school day, instruction can be given to about twenty-four students, four at a time. The driving lessons are carefully organized in a systematic way, starting out with elementary principles of starting the engine, shifting gears, operating brakes, and starting, stopping, and backing. The young driver, under careful instruction, then learns how to make turns, how to park the car, and how to turn around. These lessons are given on a street where there is little traffic. The next step is to learn driving under special conditions, on hills, at intersections, and in lines of traffic. Later he may be asked to drive in heavy traffic if he shows proficiency in driving and good judgment. He may also continue road instructions with his parents, but should follow the learning program that his instructor has set up. He is not allowed to go ahead until he can do a given task five times successfully without a mistake."[11]

The above course is that which is suggested for the prospective teacher. It is likewise the one he will more than likely use after he has developed the skeleton into a manual of his own. There are other matters that the new teacher wants to know about. These should be included in any teacher-training course and are the things we classify as administration and organization problems. Such things as the following are considered:

1. How to use the manual.
2. Time allotment.
3. Teacher qualifications, selections, and duties.
4. Integration of course with school curriculum.
5. Grade placement.
6. Credit allowance and acceptance.
7. Status of course.
8. Why course is needed.
9. Methods, materials, teaching aids.
10. Certificating new drivers.
11. Securing dual-control cars.
12. Co-operating agencies.
13. Insurance.

Initiative Coming From Other Sources

Other agencies have, in the main, taken the initiative in the matter of giving training to teachers who are attempting some work in traffic safety.

Police. The police departments of many of the large cities have co-operated with the schools by giving talks to teachers and pupils. Such work is confined largely to traffic regulations.

Insurance Companies. Many of the larger insurance companies have prepared booklets and in some cases issue monthly bulletins which offer aids for safe driving, as well as statistical materials and driving tests.

State Education and Highway Departments. Several state departments of education and highways have prepared suggested courses of study. Some have also made safety films available to the schools for use.

Automobile Associations. The American Automobile Association and its affiliated organizations have prepared tests, courses of study, bulletins and booklets which are valuable aids. Some of them have safety trailers on the road which have devices for driving and reaction testing. All of these services are available to the schools. The American Automobile Association has also, with the co-operation of some of the larger colleges and universities, conducted a series of short-term teacher-training clinics during the past summer. These courses were conducted in the following schools: Universities of Alabama, South Carolina, Kentucky, Maryland; Agricultural and Mechanical College of Texas, State College of Texas, State College of Washington, Kent State University in Ohio, Pennsylvania State College, Rutgers University, Springfield College in Massachusetts, and Texas Technical College. In addition to the foregoing, four Indian Service Schools at Pine Ridge, So. Dak.; Wingate, N. Mex.; Sequogah, Okla.; and Chilocco, Okla., also offered this course. The Chicago Motor Club is now announcing over the radio the establishment of a drivers' clinic where new drivers are trained in the skills of driving.

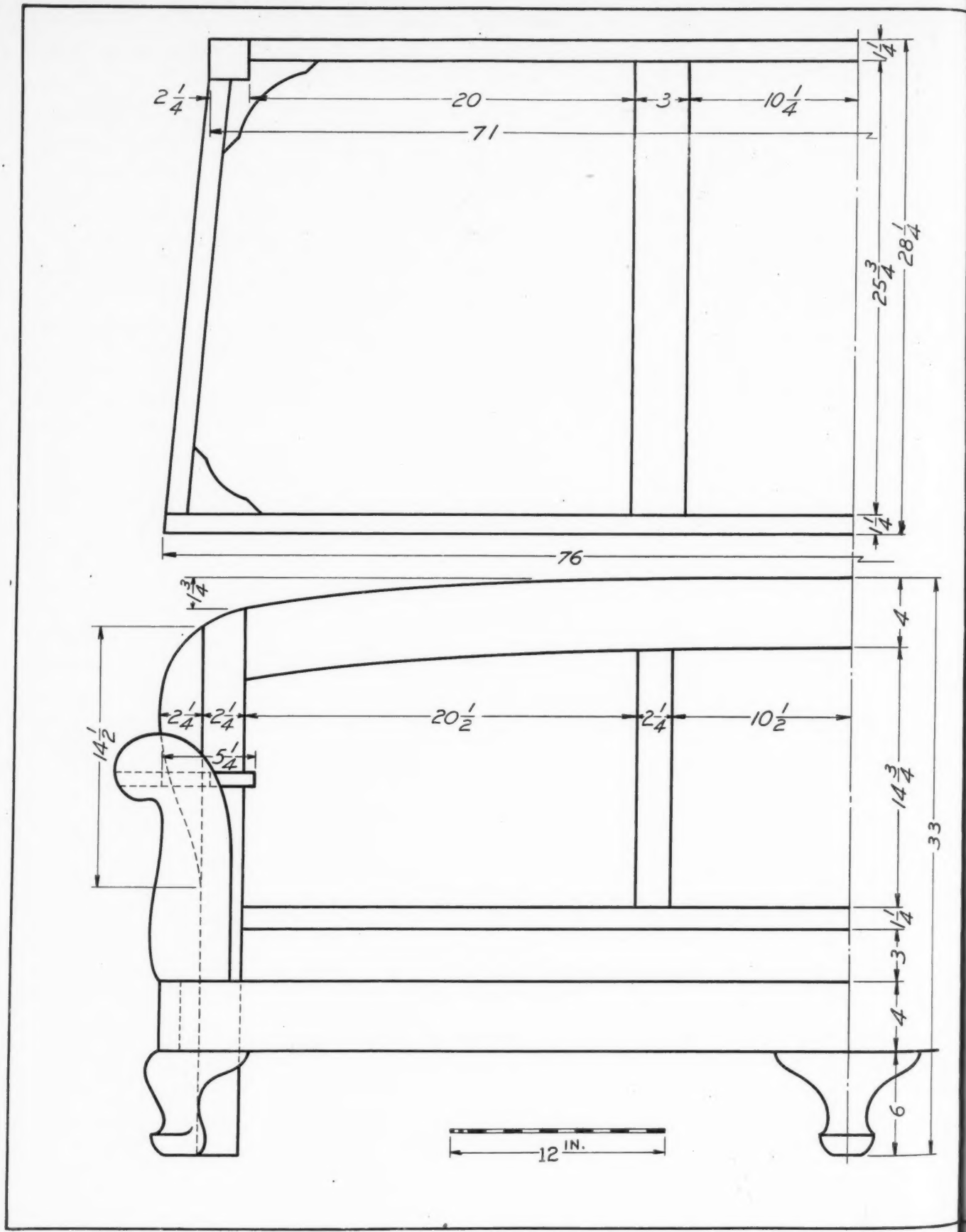
National Safety Council. While the National Safety Council deals with the whole field of safety, it has co-operated with most of these other organizations in the preparation of special materials on traffic safety. All their services are available to the members of the organization, and a good deal of their materials are available to schools free or for a nominal sum.

Despite the efforts of these various agencies, the full import of their work has not been felt because there is no guiding force to co-ordinate and unify their labor.

Sensing this condition, the National Conservation Bureau has this year established the first Center for Safety Education at New York University. The Bureau has been aware of the very rapid growth of safety education in the public schools and the need of safety experts who can guide the work of teacher training over the country. Dr. Herbert J. Stack, a pioneer in safety education in public schools, has been appointed director of the center and he has gathered about him twenty-nine experts from all parts of the country to carry on the work. With the School for Enforcement at Northwestern,

(Continued on page 27)

[11] Stack, Herbert J., *Training Tomorrow's Drivers.*



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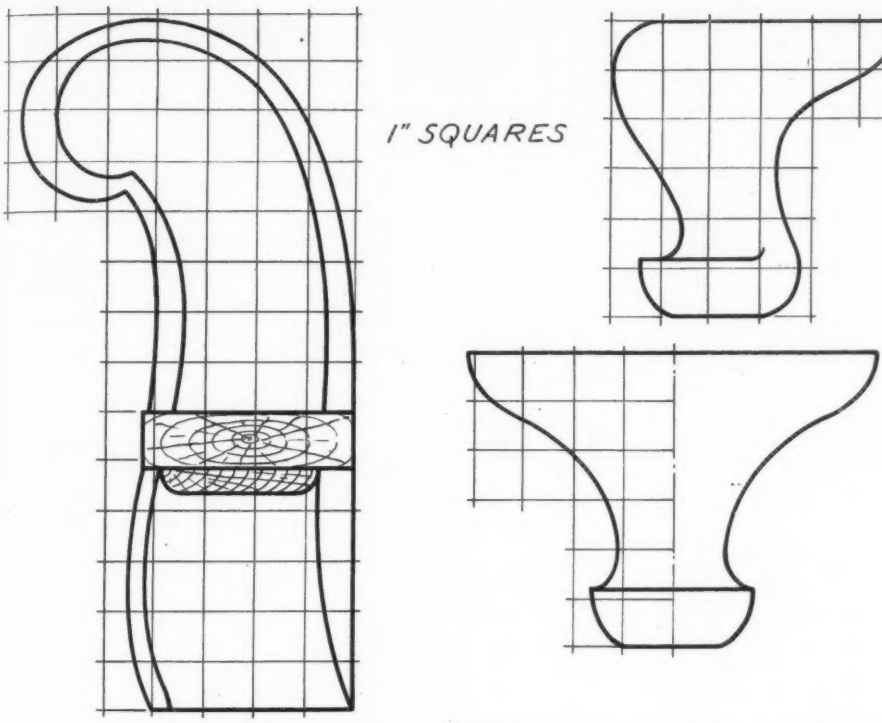
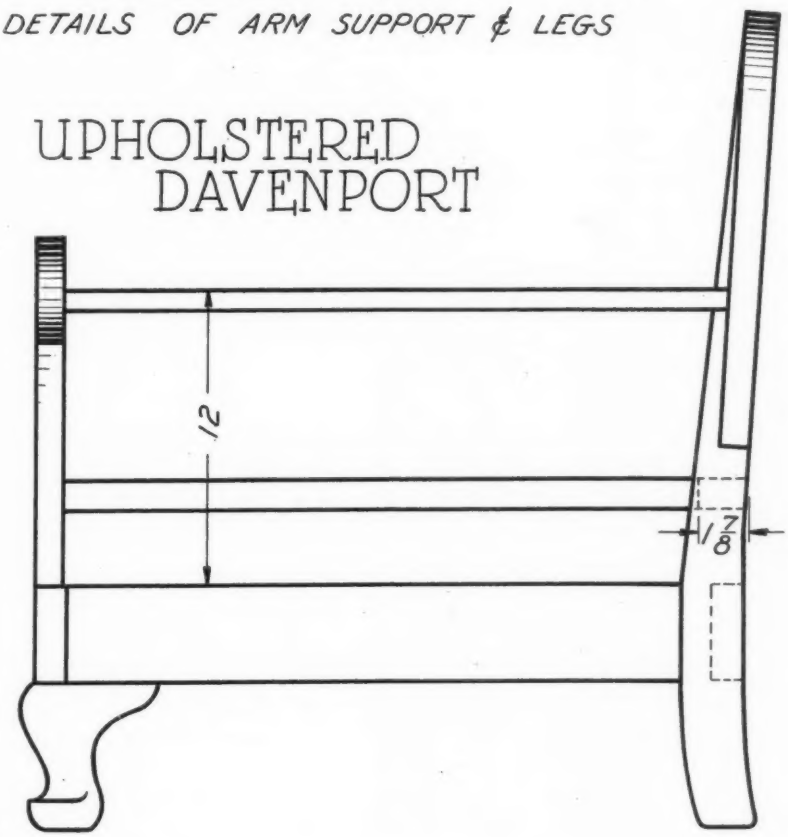
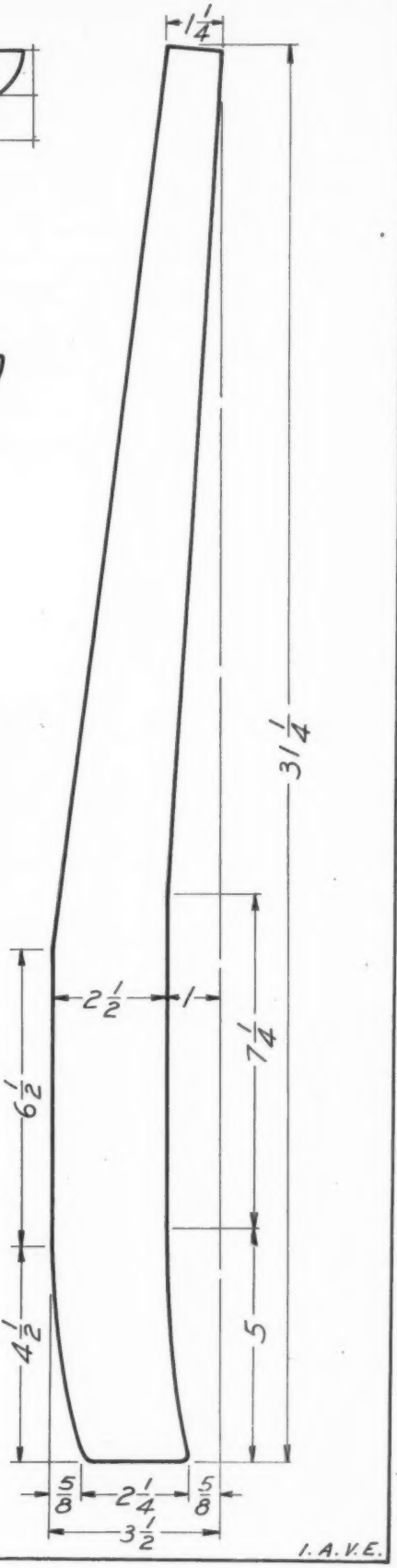


DETAILS OF ARM SUPPORT & LEGS

UPHOLSTERED DAVENPORT





(Continued from page 22)

and the School for Engineering at Yale University, this new center for Education will complete the trilogy of institutions striving to make safety instruction effective.

Responsibility of the Teachers Colleges

As has been shown in the preceding pages, the ever-increasing death and accident rate, the number of cars on the highways, and the increasing speed of those cars have aroused the general public, the press, the various organizations dealing with safety, the manufacturers of automobiles, and are finally being given careful consideration in the high schools of the country.

The beginnings in traffic and driving safety in the public schools have been meager. The rapidity with which this problem has descended upon us, the traditional caution with which educators embrace additions to the curriculum, and the lack of adequately trained teachers are but a few of the many reasons for this meager beginning. The important fact to be considered, *and remembered,* at this time is that the public schools are starting an earnest endeavor to do something to safeguard the lives of children.

Most of the work that is being done at present is not conducted on a scientific basis (except in some of the larger cities) largely because those who have taken the responsibility of this teaching have had no training except that which they have themselves been able to pick up from random sources. The work, to be of any appreciable value, cannot continue on that basis.

It is here, then, that the responsibility of the teachers college enters the picture. The pleas of Miss Samuelson and Mr. Whitney, which were directed at the field of secondary education have equal, and just as serious, implications for the teacher-training institutions. Teachers must be prepared for such work, and it is the duty of the teachers colleges to do this.

Construction of Shop Equipment

G. A. Wickman

Superior, Wisconsin

The problem of equipping school shops is a subject for constant discussion. Since it involves comparatively large expenditures of money, many schools can afford only meager equipment while some must teach shop courses with only a few simple hand tools. In the more fortunate communities, one may find an elaborate array of equipment as well as suitable teaching quarters, while in many instances, shops, although well equipped, are inadequate merely because of overcrowded conditions.

It is evident that lack of good equipment and shop facilities is instrumental in creating inefficiency and poor organization. It often brings discouragement and sometimes unwarranted criticism. This situation may be comparable to that of an industrial shop, which if poorly equipped may become a victim of inferior workmanship and inefficient production. Very often the success of an industrial plant is credited to the fact that it is well equipped and efficiently planned. Modern inventions and developments have not only imposed upon industry the necessity for speed and accuracy, but have shown also that industry must be cognizant of new developments and improvements.

A similar situation applies to the school shop. Although one may teach the fundamentals of hand methods and give instructions on obsolete and dilapidated equipment, such instruction surely does not exemplify modern industrial practices. Inadequate and poor equipment make teaching difficult, especially when classes are overcrowded. It not only creates unnecessary repairwork, but requires closer supervision, and oftentimes creates hazardous conditions. Without a sufficient number and variety of tools and machines in a given unit shop, the customary sequence of desirable operations is difficult, if not impossible, to set up. This situation is apt to foster discouragement as well as undesirable teacher attitudes.

Although shop improvement and development have been sadly neglected during the depression years, recent trends have been encouraging. With the advent of changing trends in education, principally in the growing necessity for training adults and the out-of-school group, and the return of better economic conditions, expansion rather than curtailment has taken its turn.

The effect of changing conditions has been felt especially in the Superior Vocational School. For several years the classes have been conducted in two separate buildings. Due to an unusual increase in adult enrollment and an increase because of changing compulsory-attendance laws, facilities and quarters for teaching have become inadequate. With the completion of a new building, this condition will soon

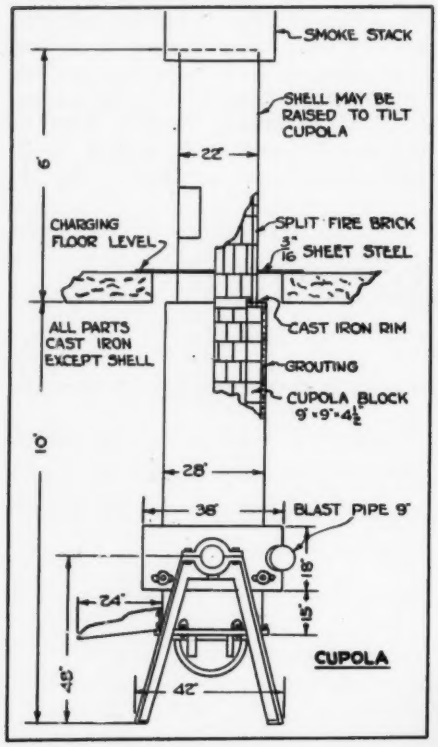
Homemade equipment frequently is the only selling argument which adds worth-while courses to the curriculum.

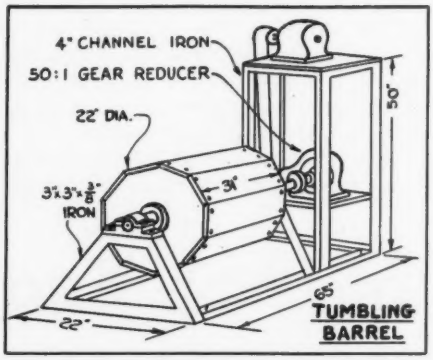
Pouring the molds

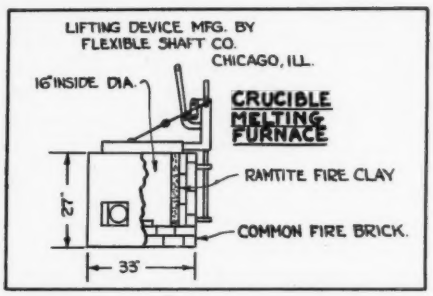
be overcome. In addition to a general building program, a small foundry unit in the general metal shop was removed and additional foundry quarters were built as an annex. By doing this, more room is now available for machine shop, welding, and forge work.

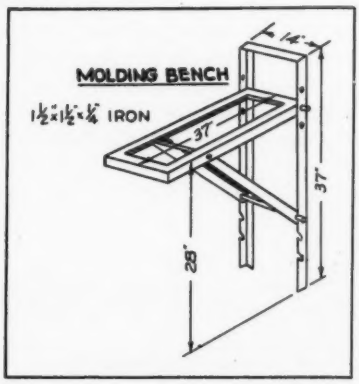
Although this program involved considerable expense particularly at this time, a federal grant assisted materially in the construction of the main addition. The cost of the foundry addition was offset by a saving made in constructing most of its equipment. This was made possible through the co-operation of three departments, namely, general metal, sheet metal, and patternmaking.

The construction of foundry equipment involves mostly work in steel structure, sheet metal, and welding. It became evident from the beginning that the magnitude of this job was a challenge, especially as a school-shop project. However the extent to which student interest was created revealed a worth-while undertaking, and at the same time the work provided some real practical training.









The equipment and tools which were made in the various departments are listed as follows:

1 Tilting-type cupola, capacity 1,500 lbs. per hour.

1 Low pressure type oil crucible melting furnace.

1 Tumbling barrel.

7 Adjustable molding benches.

1 Core bench, 60 by 20 by 32 in.

1 Core oven, 26 by 26 by 24 in.

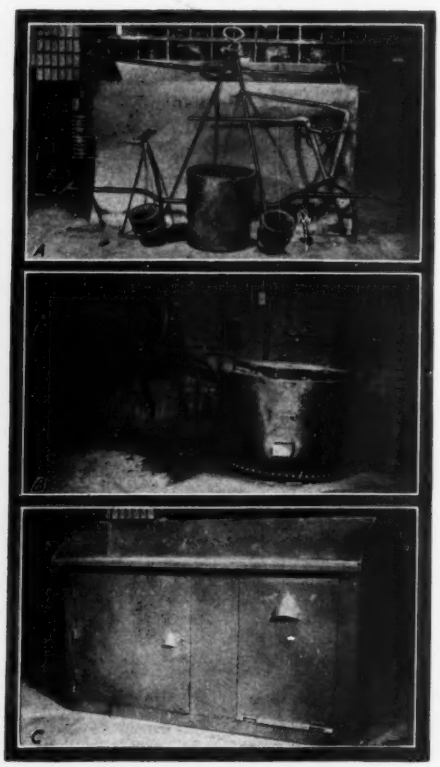
Various foundry tools such as ladles, ladle shanks, and crucible tongs.

Before actual work was begun, plans and specifications were carefully worked out. Information on various technical problems concerning cupola and furnace dimensions were obtained from local foundries and manufacturers of foundry equipment. Methods of construction and production routine were organized to conform with the available student help and time. Several advanced adult students were selected to act as supervisors and to assume considerable responsibility.

Fortunately, patterns for a tilting-type cupola were found at one of the local foundries. Several additional patterns were made in the school pattern shop. These were cast and delivered to the general metal shop for machining and assembling. The cupola shell, which was made of ¼-in. steel plate, was furnished and rolled by a local ship-building concern. This was electrically welded by the students of the welding class. The sheet-metal department constructed the upper stack, the blast pipe, and facilities for weather and spark protection. To complete the cupola, a local bricklayer was called in to lay the cupola block.

The crucible melting furnace was made

Shaking out the mold



A. Foundry tools. B. Crucible melting furnace. C. Core bench

from an old boiler dome, the bottom and sides were lined with common fire brick, after which a commercial fire-clay preparation called "Ramtite" was used to form the interior to the desired dimensions and shape. To produce a true circle, a wood form was placed inside the furnace and the clay was then rammed around it. A slow wood fire was used to dry it out. The lid consisting of common fire brick is supported by an adjustable square steel frame. A lifting device for raising the lid was purchased from a Chicago manufacturing concern. A commercial-type low-pressure fan and air-nozzle unit was obtained for heating.

The frame for the tumbling barrel was made from both angle and channel iron. By making the barrel itself decagonal in shape rather than round, it was possible to cast the part in the school foundry, and in that way save the cost of buying steel plate and having it rolled. A gear-reduction unit with a ratio of 50 to 1 was found at a local junk yard. This was used in connection with a 3 h.p., 1200 r.p.m. motor.

A gas core oven and core bench were made by the sheet-metal and welding departments. In order to maintain heat, the core oven was made with double walls and filled with asbestos. The core-bench frame was made of welded pipe with a sheet-metal covering. The top consists of a slab

Charging the cupola

Polishing wheel

Filling the ladles

of slate. Compartments are made beneath the bench for storing core sand and core oil.

The molding benches were made from 1½-in. angle iron. In order to fit all the students, these were made adjustable for height. In addition, various tools such as crucible shanks, tongs, mold weights, and ladles were forged, cast, and rolled, respectively, to conform with the commercial product.

As a result of greater foundry facilities, it is now possible to provide a more thorough foundry course, as well as an improved machine-shop course. The opportunity to carry through a series of productive processes from the making of patterns to the machining and assembling of parts has made the construction of the foundry equipment a valuable asset to a comprehensive general metal course.

Blueprint Reading

Howard G. Stintsman

East Side High School,
Newark, New Jersey

A plea for emphasizing blueprint reading rather than mechanical drawing during the first two years of high-school work.

Man has used some form of the graphic language for centuries. In many cases he has used drawings to aid him in his constructive endeavors. The idea of planning work on paper, or some similar material is also very ancient. Roman architects mention the drawing of plans and elevations.

Until the advent of the Industrial Revolution most of the drawings applied to architectural work. Mechanical drawing, as we know it, is an outgrowth of the Industrial Revolution. A need for some system of view placement was necessary. This need was partly fulfilled by Gaspard Mong, a noted French mathematician and physicist, who published a book on orthographic projection in 1795.

During the first half of the nineteenth century, draftsmen seemed to have devoted themselves to the task of making drawings for the sake of drawing itself.

After the Civil War, industrial enterprise and manufacturing advanced by leaps and bounds. Until a process of blueprinting was discovered, the original drawings were used by the workers. In 1879, Silliman and Farnsworth of New York produced three blueprints.

Modern drafting began around 1880. Drawings began to lose their ornate character and assume the role of simplicity and accuracy. Drawings or blueprints were used as a means to an end, that end being the production of material things, that should enrich the lives and happiness of the people who reside for a short time on this globe.

At the present time we are in the midst of a Mechanical Age. Nearly all the articles we use or touch have been produced by mass-production methods during some stage of their manufacture. Mass-production methods depend upon the use of clear and accurate drawings.

The people that come into contact with mechanical drawing can be divided into two groups. First, the *originating group*, or the people that make or produce the drawings. In this group we find the inventors, engineers, architects, and draftsmen. The second group might be called the *interpreting group*, or the people that translate and put the information into action. This group contains patternmakers, machinists, repairmen, and all people engaged in any constructive work dealing with materials. This group also contains those who may want to glance at a drawing merely to get some sort of information from it. This makes practically everyone a potential consumer of drawings.

The United States census of 1930 gives some information as to the size of each of these groups. The originating group contains 343,711 males. The interpreting group contains at least 12,000,000 people, who are engaged in manufacturing and mechanical industries. Many more people in other classes of work could be counted as consumers of drawings, but the numbers just given, may be used as a basis of computation.

By simple arithmetic, one can see then that there is one originator to thirty-five consumers. Upon the basis of these figures, it would seem that the major job for teachers of drawing would be to teach boys to read and interpret drawings.

Most schools up until now have placed the emphasis on the making of drawings, and have neglected to impart the ability to interpret them. The idea seemed to be that the student will learn to interpret drawings by making a few simple drawings. The time that is spent on one drawing, however, might well be spent interpreting or reading three or four drawings. The reading ability would thus be increased.

The vast majority of students taking mechanical drawing in high school will not be called upon to use, to any extent, the *making* ability. It seems more probable that most of the students will come into contact with drawings as readers or interpreters. It seems best, therefore, that more emphasis be placed on the ability to read drawings in the early part of the student's high-school career, and that the acquiring of skill in making drawings be put off until later in the high-school course.

This does not mean that the making of drawings should be abolished entirely in the early part of the student's high-school life, but merely that the emphasis should be shifted to the reading or understanding of drawings.

In view of the foregoing, it might be well to spend probably half of the time upon some type of blueprint reading in the early part of the boy's high-school career.

Several exercises and devices for teaching the understanding and interpretation of drawings have appeared in the past numbers of the INDUSTRIAL ARTS AND VOCATIONAL EDUCATION magazine. Even a game called "Visualize" has been described. Good books on blueprint reading also are available. *A Primer of Blueprint Reading* by Diamond has been found to be very helpful.

The time spent upon this type of work may then be reduced during the last two years of the high-school course, so that the students who remain may be given more work that will develop skill and accuracy in the making as well as in the understanding of drawings.

Senior mechanical engineers recording data on flue gas analysis. Case School of Applied Science, Cleveland, Ohio

Problems and Projects

A PRACTICAL WOODWORK TEST

Isadore M. Fenn, Roosevelt High School, Chicago, Illinois

Do you give your classes practical tests? Many industrial-arts instructors today use standardized objective information and mechanical-aptitude tests in their shop teaching, with the thought that they are testing the entire accomplishments of the student. It can readily be seen that this procedure overlooks an important phase of present-day shop practice — the manipulative work of the student.

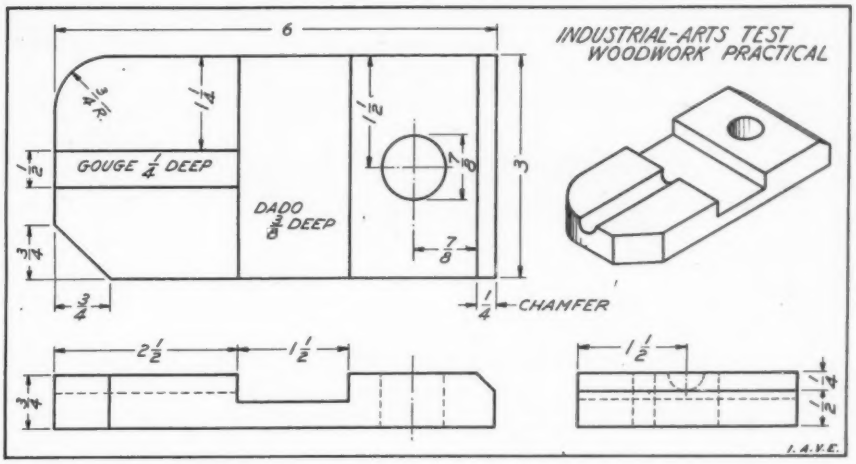
A practical test would give the industrial-arts instructor a more complete picture of the mechanical aptitude of the individual, and would place him in a better position to give the student guidance in the matter of choosing further industrial-arts work.

It is important that the industrial-arts instructor should not disregard the testing of the manipulative work for the following reasons: First, to discover whether the student is mastering the manipulative work; second, whether the manipulative work is too easy or too difficult for a given group or class; third, for the purpose of comparing the work of one group or class, with that produced by other groups; fourth, for obtaining information for guidance purposes.

Students taking industrial-arts courses frequently possess very little information concerning the nature of things. Some of them seem to be unable to plan and solve the mechanical problems arising in the shop, while others show remarkable understanding and capacity for this kind of work. Some students are by nature technically inclined and through their interest attain a general knowledge about the shop, yet because of slow adaptability these same students are very poor in shop performance. An investigation has shown that shop performance may be taught to the student who has very little or no previous shop information; also that shop performance may be stressed in the teaching of industrial arts.

Stenquist asks, "May a child not be expert with his fingers and be able to score high in working with actual materials and still have but little knowledge of the kind called for in the picture tests?"

It is true that certain kinds of related or broadening information are desirable, but these are not fundamental to manipulative work. Manipulative work is fundamental to them, and therefore should not be subordinated. One cannot operate a lathe or job press, weld a joint, make a drawing, or mend a screen, with information alone. Manipulative work is still the fundamental content in shop learning and will continue to be so. Those who emphasize information should realize that there is not reason today any more than in the days of apprentice crafts for tolerating shoddy workmanship. To stress information first is to ignore craftsmanship. To ignore craftsmanship is to ignore that phase of creation which combines with art to make the realities of everyday living. There will always be a certain amount of technical information that must be taught, and taught well by shop teachers in order that the manipulative instruction may be effective.



As manipulative work is still the fundamental content in shop learning and as an investigation has shown that shop performance may be taught to the student who has little or no previous shop information, stress should be placed upon practical or manipulative tests instead of upon written tests.

An interesting practical test for woodworking classes is suggested and illustrated here. This test was given at the Tilden Technical and Roosevelt High Schools to the first-semester students, during the last week of the course, as a final practical woodworking test. The following list of manipulative processes were performed in the execution of this practical test. Included in the list is a suggested number of points to be used in grading each process.

	Points
1. Squaring up stock to dimensions .. (five points for each side)	30
2. Chiseling a convex curve	10
3. Sawing a corner	5
4. Chamfering a corner	5
5. Chamfering an end	10
6. Boring a hole	5
7. Cutting with a gouge	15
8. Chiseling across the grain in the construction of a dado	20
Total Score	100

The following list consists of the tools used in the above processes:

1. Jack plane
2. Smoothing plane
3. Try square
4. Rule
5. Crosscut saw
6. Ripsaw
7. Marking gauge
8. Chisel
9. Mallet
10. Backsaw
11. Brace
12. Bit
13. Gouge
14. Sloyd knife

This suggested practical woodworking test may prove helpful to industrial-arts instructors in the construction of suitable practical tests for their own classes.

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SOLDERING IRON

E. W. Jones, Kansas State Teachers College, Pittsburg, Kansas

The electric soldering iron shown in Figure 1 is simple in design, cheaply built, and suitable for hand-tool construction. Even the handle, though better turned on a lathe, may be made by hand. The watts consumed may be varied by varying the length and size of nichrome wire. The material cost is approximately 40 cents. Figure 2 shows the details of construction.

Soap carving and civic planning, Samuel J. Tilden High School, Brooklyn, N. Y. Mrs. Eva Margolis, Instructor

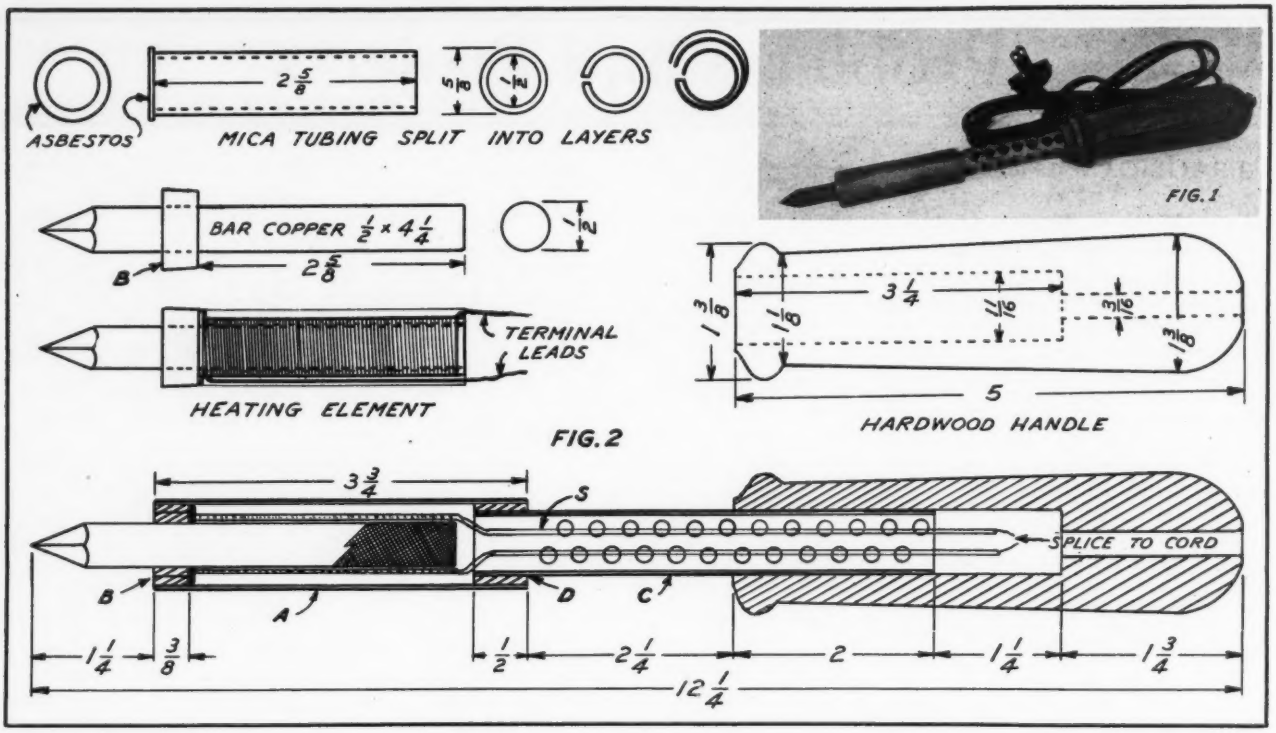


FIG. 1

Soldering iron submitted by E. W. Jones

Tubes A and C. The body tube *A* is made of ¾-in. (electrical trade size) thin-wall conduit or "steel tubes." The handle tube *C* is made of ½-in. thin-wall conduit. Sometimes scraps of thin-wall conduit may be obtained free of charge from electrical contractors. Tube *C* contains six rows of ¼-in. holes, staggered as shown, beginning ½ in. from the front end. To lay out the holes, first cut a strip of paper that will exactly reach around the tube, and divide the strip by drawing six lines across it equally spaced. Wrap the paper around the tube and mark off the lines on the tube with a pencil. Use a straightedge in drawing the lines along the tube. Space the holes ½ in. apart and indent deeply with a sharp center punch. Drill the ¼-in. holes. Remove all burrs from both the inside and outside of the holes with a round file.

Bushing *D* is a ¾-in. steel tube, ½ in. long, split on one side lengthwise with a hacksaw and forced into tube *A*. Tube *C* is then driven into the bushing. This joint should be a tight fit.

Wood Handle. The handle is best turned in a lathe, but may be made with a knife, file, and sandpaper if desired. The 11/16-in. hole bored for tube *C* may be reamed to proper size by rotating a piece of the ½-in. tubing, having a sharp burr on one end, and pressing the handle onto the tubing as it turns. This may be done in a lathe or by other means at hand. Oak, walnut, and gum make good handles. Finish as desired.

Copper Core. Bushing *B*. The core is made of ½-in. round, bar copper, 4¼ in. long, the point being sawed and filed to shape, or heated and forged on an anvil. Make bushing *B* by grinding the outside of a ⅜-in. iron pipe (standard water or gas pipe) until it will drive tightly into a ½-in. iron pipe, (same kind) a distance of about ½ in. Then the bushing is cut to a length of ⅜ in. by sawing through both pipes at once, after which it is again ground on the outside for a tapered fit in body tube *A*. Next drive the bushing tightly onto the copper tip as shown in Figure 2, enlarging the hole, if necessary, with a round file.

Insulating the Copper Core. First, place a ring of asbestos around the copper against bushing *B*. This may be made of a strip of asbestos paper ¼ in. wide, dampened with water, and wrapped around, then pressed against the bushing and dried. Second, cut a piece of mica (or micanite) tubing, ½ and ⅝ in. diameter by 2⅝ in. long. Split the tubing lengthwise with a knife or fine hacksaw. Peel off the outer layer of paper and throw it away. Separate the remaining tube of mica into two layers with a knife. Place the inner layer on the copper core tightly against the asbestos ring and save the outer layer to put over the heating element after it is wound. Next, wind on the element. Sheet mica for insulating the heating element is preferred by some, but it often breaks badly in wrapping and is more difficult to handle.

Insulating the copper core with asbestos instead of mica is cheaper and easier, but not as durable. To do this, first place the ring of asbestos against bushing *B* as described above. Then cut a piece of asbestos paper 2¾ by 3¼ in. and wrap it twice around the copper. Wet it with water and bind on tightly with a strip of cloth or cotton tape until dry. Any asbestos paper extending over the back end of the copper core is folded in to cover the end. Ridges or rough places on the asbestos when dried may be smoothed off with a knife or file, after which wind on the heating element.

Winding the Heating Element. The heating element is wound with No. 30 nichrome wire. For a hot, fast heating iron on 115 volts, use 18 ft. of this wire, for medium speed 20 ft., and for slow iron, 22 ft. Twenty feet is usually preferred. These lengths include the 7 to 10 in. used in making terminal leads. The watts consumed vary from 80 to 120, depending on length of wire in the element. If a 150- to 200-watt iron is desired, use ⅝-in. copper core and No. 27 nichrome for the element. In this case, 1-in. thin-wall conduit is required for body tube *A*.

After cutting the wire to length, wind it loosely on a small spool for safe handling. Support this spool, together with a spool of small sewing thread (about No. 50) on a rod, ready for winding. Chuck the tip of the copper core in a lathe or in a breast drill, so it may be rotated slowly. Begin winding next to bushing *B*, tying the first few turns of nichrome wire in place with twine. Then complete the winding in one layer, spacing the turns by means of the thread wound in between the turns of wire, the thread and wire being held side by side as they are wound on. Space the turns very close together, leaving no gaps. This is important. The last few turns are also tied in place with twine until the terminal leads are put on. The thread is not removed.

Terminal Leads. To make a terminal lead, sufficient element wire is unwound from under the twine tie to reach the cord splice in the wood handle. This requires about 9 in. at front end of element and 6 in. at rear end. To reinforce the front lead, an additional 20 in. of No. 30 nichrome wire is cut from the reel and doubled into a long loop. This loop is placed around the mica tube at the front end of element and twisted tightly. The two strands of the looped wire and the 9 in. of element wire are then twisted into a 3-ply cable by chucking the ends all together in a hand drill and slowly turning the drill. Repeat the process for the rear terminal lead. Remove the twine ties. Bring the two leads out on opposite sides of the element, as shown in Figure 2. Slip 6 in. of asbestos sleeving onto each lead as shown at *S* in Figure 2, for insulation.

The next step is to wrap the second layer

of mica tubing around the heating element, tying it with twine. The front terminal lead is laid down on the outside of the mica and held by the same twine. Then a strip of mica is placed on top of the terminal lead to insure good insulation from the body tube *A*. Finally, the whole element is wrapped with enough asbestos paper to fill completely the body tube *A*. It is put on damp and bound with a strip of cloth or tape until dry. This molds it in place. When dry, remove the tape, smooth the outer surface with a knife or file, and insert in body tube *A*. CAUTION: All moisture must be dried from the element by heating before inserting in tube *A*, to prevent burning out.

Cord and Plug. Run the cord (No. 18, all-rubber) through the handle from back end, tie a knot about 1½ in. from the end and connect the conductors to the terminal leads. Solder and tape the splices. Pull the knot back into the handle at the same time that the tube *C* is pushed into place. The knot must be so placed as to prevent all strain on the terminal leads. Place an attachment plug on the cord.

WELDING STANDARDS FOR VOCATIONAL DRAFTING

Joseph Krob, J. Sterling Morton High School, Cicero, Illinois

The increased use made of the welding process in industry makes the adoption of definite welding standards for use in the drafting room and shop a real necessity.

There is a set of standards used by the American Welding Society. These are to be recommended to the American Standards Association for adoption. Until such adoption, the welding symbols adopted by the Illinois Carnegie Steel Corporation may be considered the most complete and concise standards that we have.

The student of vocational drafting and vocational metalwork should have this information before going into industry, and it is for this reason that this material is herewith presented.

In the system tentatively adopted by the welding industry, the word *weld* does not appear on drawings showing objects which require welding. Instead, symbols are used which tell the welder whether chipping, peening, or preheating is necessary, the kind of weld to be made, and other necessary data.

Under fusion welding are included T joints, lap joints, edge joints, corner joints, butt joints, and welded surfaces; while, under resistance welding we have spot, projection, seam, and butt joints. Because of the similarity existing between the symbols used for V and bevel-grooved welds, and for the U and J grooved welds, care must be used by the draftsmen clearly to indicate what is wanted. See Figure 2.

As shown in this same figure, field welding is indicated by a black dot, and for the weld-all-around symbol, the circle is used. Finish on welded surfaces is designated by the individual plant to suit their particular needs.

The welding symbol in Figure 1 shows the location of all information and is self-explanatory. The specification reference T in the tail of the arrow refers to a table of specifications which indicates the type of weld to be made. If specification references are not used, the tail of the arrow should be left off.

In Figures 2 and 3 are shown the fusion and resistance welding symbols and Figure 4 illustrates the types of grooves for fusion welds. Figures 5 to 10 inclusive illustrate the

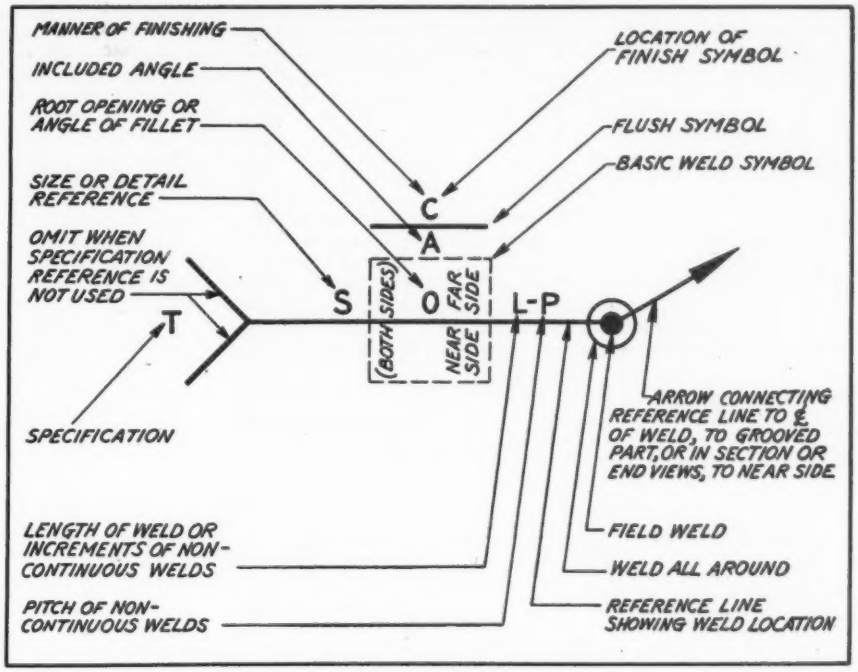


Fig. 1. Welding symbol

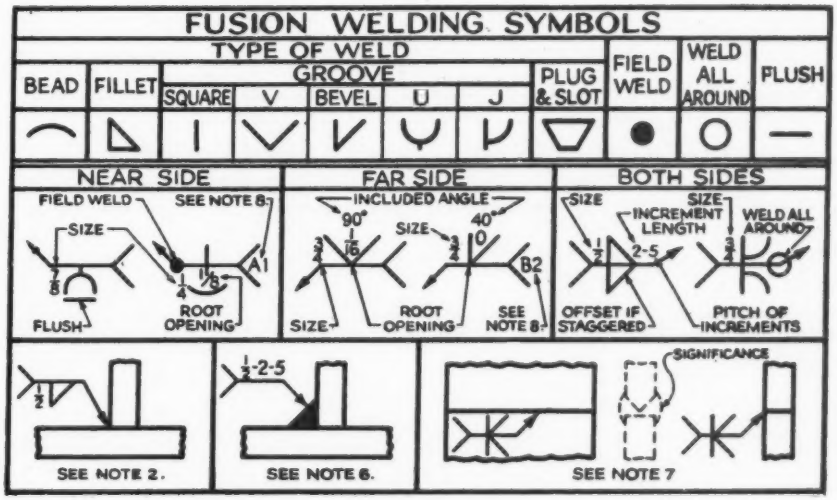


Fig. 2

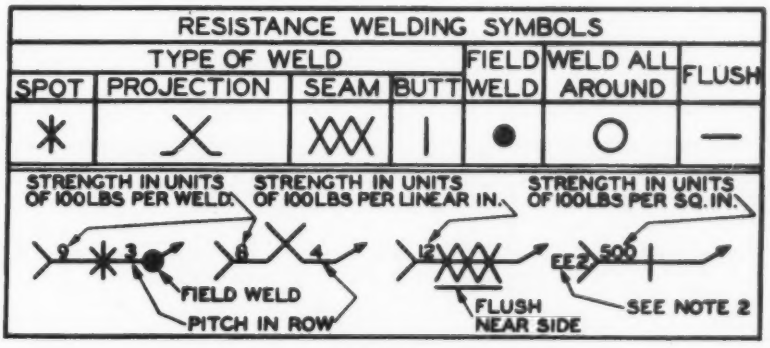


Fig. 3

welding symbols used for typical joints. With these welding symbols every conceivable type of weld can be taken care of. The standards may seem very involved but a careful study of a detailed description of them will make them easy to understand. The welds may or may not be shown on the drawing depending on the plant using them. Notes, legends, and specifications may be shown on the drawing or on supplementary sheets. If shown on the drawing, they may be printed on the blank tracing paper and this is probably preferable to sheets separate from the drawing itself.

Some general instructions for use of the welding symbol are: All welds except plug, spot, and projection are to be continuous unless otherwise specified. Symbols are to be placed on reference line of arrow and arrow is connected to the joint. For welds on near side of member the symbol should be shown on near side of reference line, for far side on far side of reference line and for both sides on both sides of the reference line. The word *weld* is not to be used. Symbols may be made freehand. In joints where one joint is grooved arrow points to grooved part. Total penetration of square grooved welds is complete unless otherwise specified. In resistance welding welds are designated by strength instead of size, and special welds are covered by notes, detailed sections, or a reference drawing.

A set of gauges can be readily made for inspection of the accuracy of welded surfaces as to concavity, convexity, and straightness and help make a quality product. Excess con-

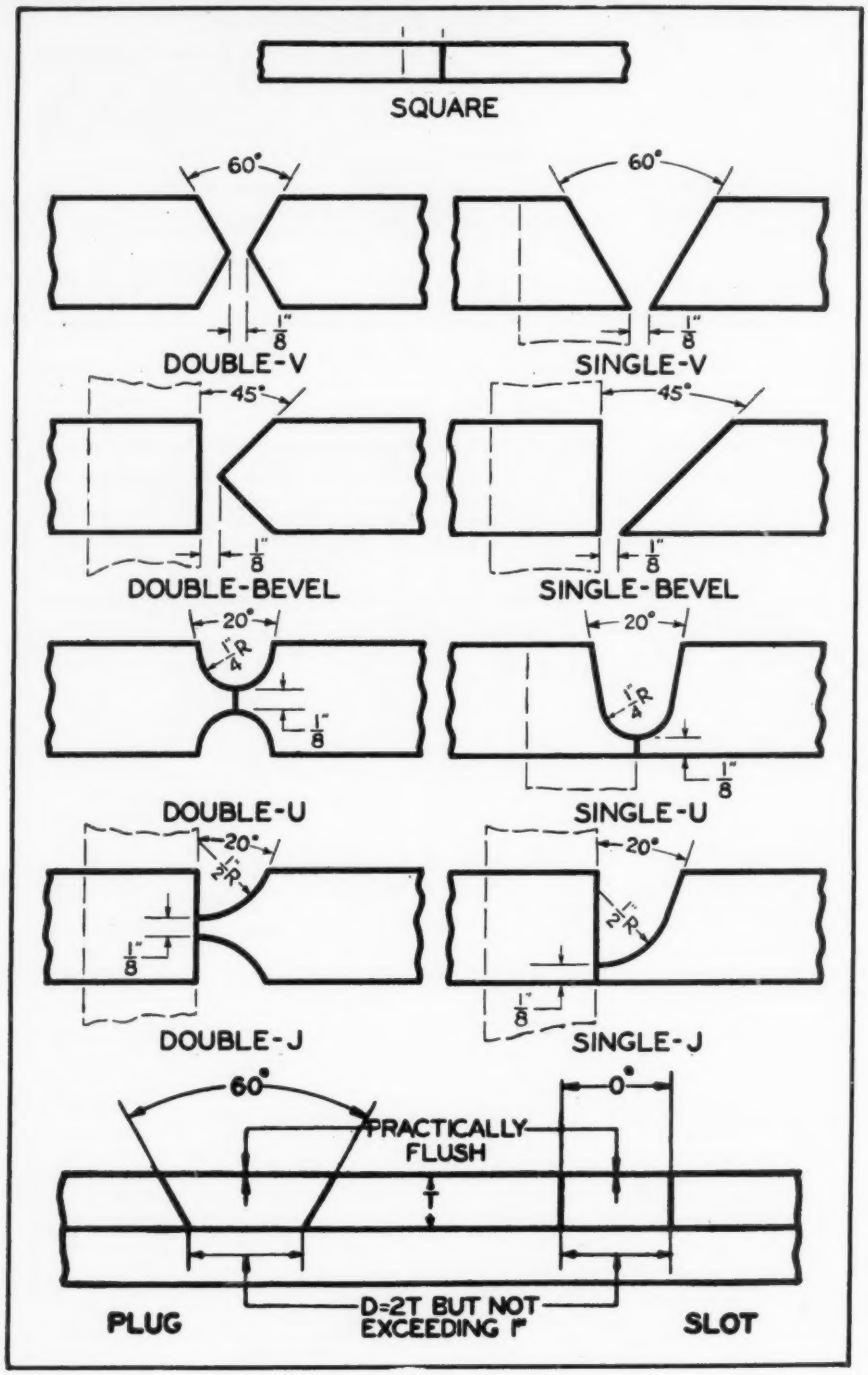


Fig. 4

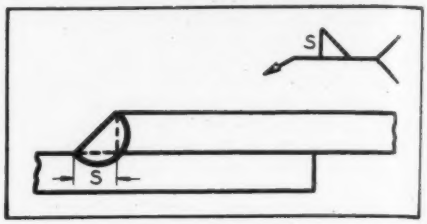


Fig. 5. Lap joint

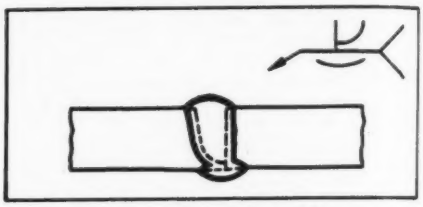


Fig. 6. Single J butt joint

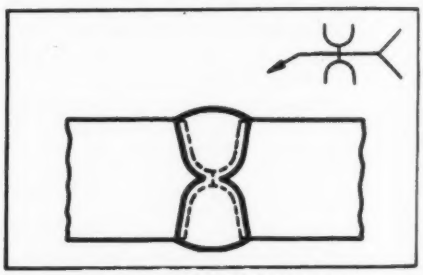


Fig. 7. Double U butt joint

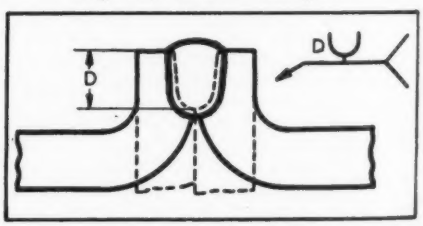


Fig. 8. U Edge joint

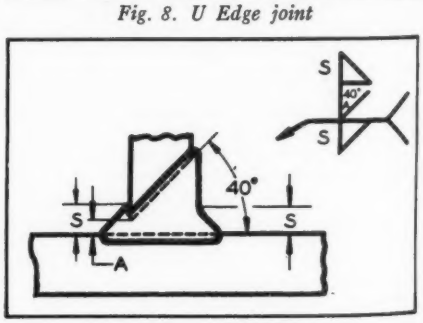


Fig. 9. T joint

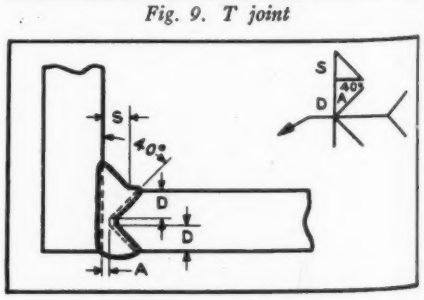


Fig. 10. Corner joint

vexity is to be avoided because of waste of filler material while excess concavity is to be avoided due to loss in strength of weld. A table of specifications will depend on the plant and will also tend to insure a better quality of product. Undercutting and overlapping should not be permitted as they result in weak welds.

If the roots of grooved welds are not chipped, flaws are likely to remain, and for heavy work subject to tension and fatigue, chipping should be used. Peening will lessen the distortion of the joint and fill up holes on heavy castings. The first and last layer of grooved welds need not be peened. Preheating depends on the base metal to be welded, since the metal surrounding that portion which is heated locally acts as a quenching medium, hardness will be produced in the vicinity of the weld. If the part is preheated to 350 deg. F. this effect can be minimized considerably.

Stress annealing should be considered seriously if parts are more than ¾ in. thick because in machinery, the locked-up stresses will cause the welded part to crawl and throw the part out of alignment.

The majority of welding is done by the shielded manual metal arc, supplemented by the bare metal arc, automatic metal arc, smothered metal arc, shielded carbon arc, bare carbon arc, and oxyacetylene. Parts 3 in. or more in thickness up to unlimited amounts can best be welded by the thermit process.

The Illinois Carnegie Steel Corporation has published a booklet on these welding standards, and instruction in their use, which the instructor will find very helpful.

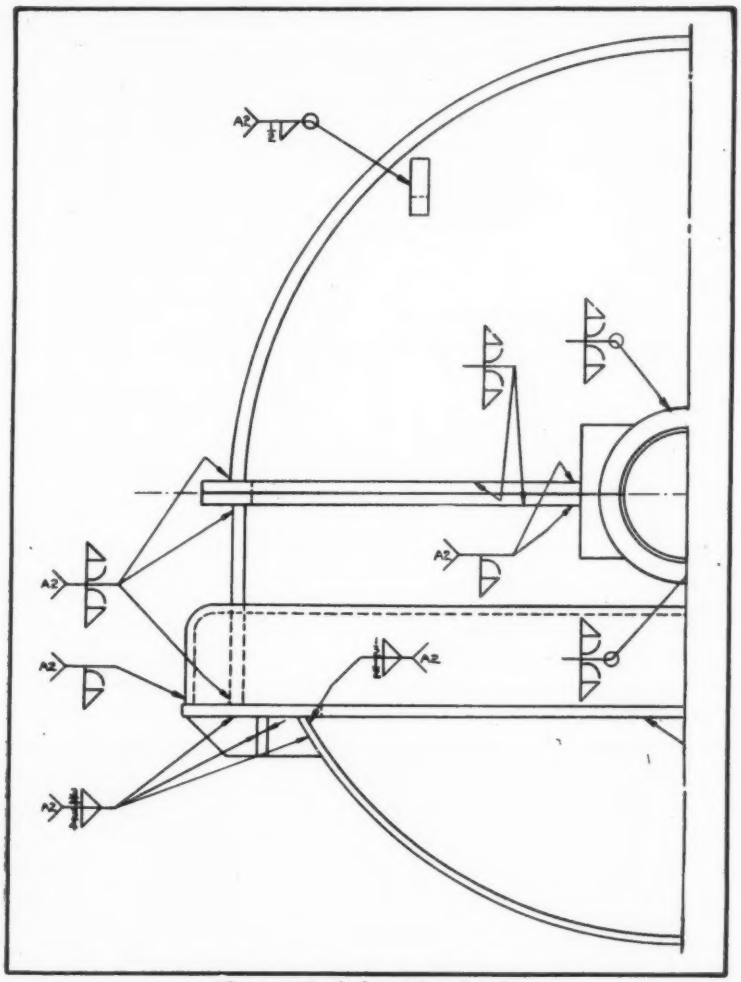


Fig. 11. Typical welding drawing

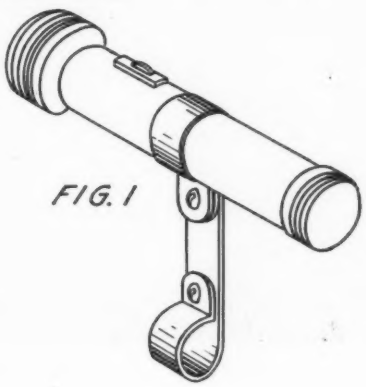


FIG. 1

BICYCLE FLASHLIGHT CLAMP

William J. Becker, Boynton Junior High School, Ithaca, New York

Even if the New York State law did not require it, safe bicycle operation dictates that at night the rider should have at least a front light. The bicycle clamp described here was designed to fit the ⅞-in. diameter handle bars which are found on most bicycles. It must, of course, be built to fit any diameter flashlight.

Material

Handle-bar clamp, 1 pc. ⅛ by ¾ by 6½ in. wrought iron.

Flashlight clamp, 22-gauge black sheet iron, ¾ by 5⅜ in. if a small diameter flashlight is used; ¾ by 6⅜ in. if a large diameter flashlight is used.

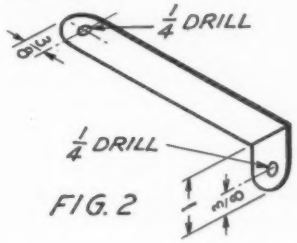
NOTE: Measure the circumference of the particular flashlight for which the clamp is to be made, because they vary somewhat. For the flaps, add 1¾ in. to the measurement found.

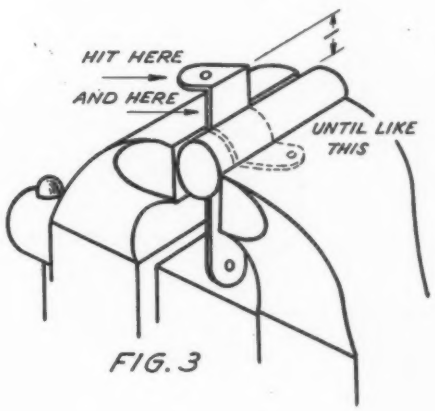
Directions

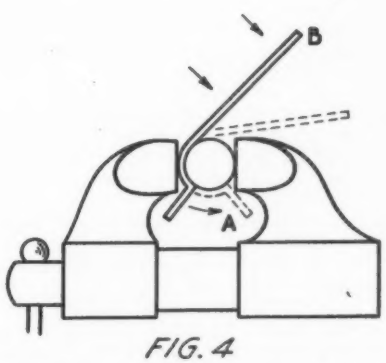
1. Make bill of material for job and have the instructor approve.
2. Cut out stock as listed in the bill of material.

Handle-Bar Clamp

1. Round ends on power grinder. Smooth, using proper file.







2. Drill a ¼-in. hole at each end as shown in Figure 2.
3. Make right-angle bend at one end.
4. Clamp piece in vise over ⅞-in. round iron bar. See Figure 3. Clamp bar near top of vise jaws and have piece approximately 1 in. above top of vise jaws.
5. Round piece as far as possible, hitting in direction shown by arrows in Figure 3.

6. Change piece in vise as shown in Figure 4. Metal at *B* must be forced down around bar until it assumes the dotted position.

7. Turn work in vise so *A* is back farther as shown in Figure 4. Continue bending back as far as possible.

8. Finish bending in place by putting in vise as shown in Figure 5 and bend *B* back as shown by dotted line.

9. Where hole of clamp meets back, drill through with a ¼-in. drill.

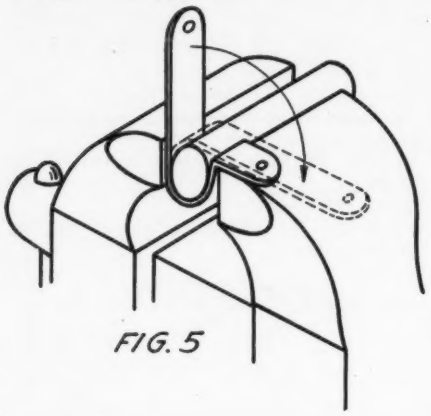


FIG. 5

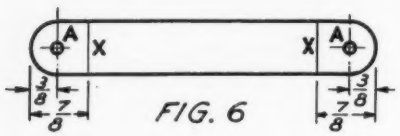


FIG. 6

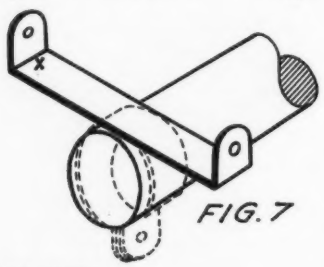


FIG. 7

Flashlight Clamp

1. Lay out piece as shown in Figure 6.

2. Center punch for holes *AA*, and drill with a ¼-in. drill.

3. Make right-angle bends at *X*. See Figures 6 and 7.

4. Use portion of a round stake corresponding to the size of your flashlight and bend piece to shape. Figure 7.

5. After piece assumes a round form as shown by dotted circle in Figure 7, slip a bolt through the holes and fasten flaps together. With flaps so fastened, it will be easier to round the piece smoothly.

Assembly

1. Secure bolts from instructor and fasten the clamps together.

2. Clean job with emery cloth and enamel as desired.

References

1. *Metalwork Essentials,* Tustison and Kranzusch (The Bruce Publishing Co., Milwaukee, Wis.)

2. *Metal Work,* Jones (The Bruce Publishing Co., Milwaukee, Wis.)

Questions

1. How long would you cut a piece of metal for a 1½-in. diameter flashlight? Allow ¾ in. each for flaps. (Ref. 2, pp. 12, 13.)

2. Explain why it is important to securely fasten the work prior to drilling. (Ref. 2, pp. 36, 37.)

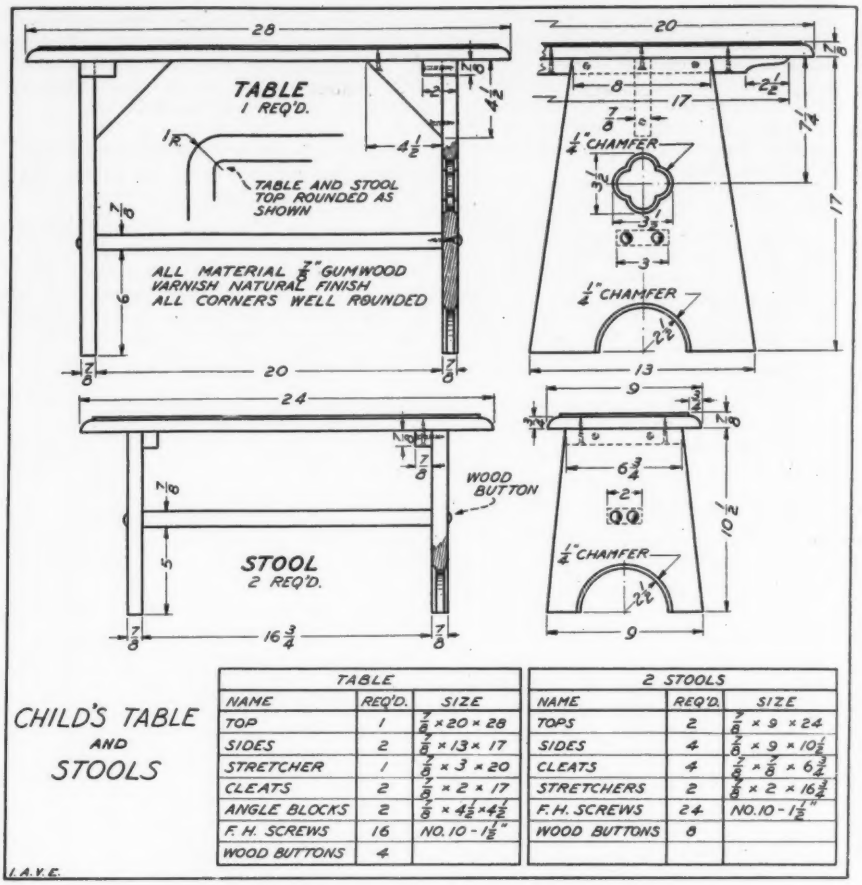


TABLE		
NAME	REQ'D.	SIZE
TOP	1	7/8 × 20 × 28
SIDES	2	7/8 × 13 × 17
STRETCHER	1	7/8 × 3 × 20
CLEATS	2	7/8 × 2 × 17
ANGLE BLOCKS	2	7/8 × 4½ × 4½
F. H. SCREWS	16	NO. 10 - 1½"
WOOD BUTTONS	4	

2 STOOLS		
NAME	REQ'D.	SIZE
TOPS	2	7/8 × 9 × 24
SIDES	4	7/8 × 9 × 10½
CLEATS	4	7/8 × 7/8 × 6¾
STRETCHERS	2	7/8 × 2 × 16¾
F. H. SCREWS	24	NO. 10 - 1½"
WOOD BUTTONS	8	

I. A. V. E.

Designed by T. J. Kuemmerlein, Boys' Technical High School, Milwaukee, Wisconsin

3. Explain the construction and use of the circumference rule. (Ref. 1, p. 2.)

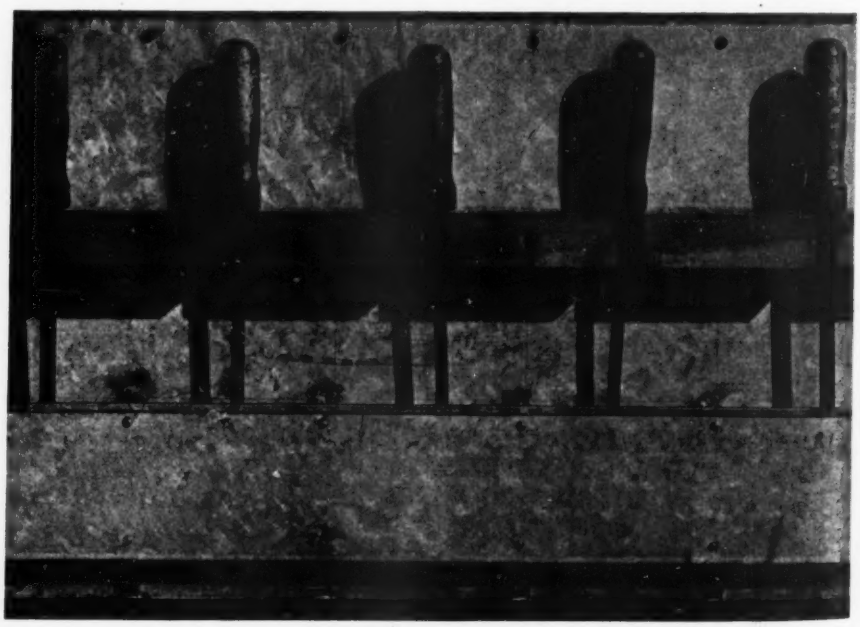
4. What are a few factors a person must observe in the use of a hacksaw? (Ref. 1, p. 79.)

5. What is drawfiling? When would you use this process? (Ref. 1, p. 92.)

GUARD FOR SOLDERING COPPERS

Allen Glisch, Public Schools, Milwaukee, Wisconsin

"An ounce of prevention is worth a pound of cure." With this slogan in mind, a Mil-



Guard for soldering coppers

waukee shop instructor has built the guard shown herewith to prevent students from accidentally coming in contact with cooling soldering coppers that are still hot. This guard is made of sheet metal. It has an individual pocket for each copper.

IMITATION MARBLE PEN STAND

Jos. J. Lukowitz, Milwaukee, Wisconsin

The pen stand shown at *F*, in Figure 1, is made of Keene's cement, colored to imitate marble. The use of this type of cement in industrial-arts classes in schools is destined to become increasingly popular. Practical, up-to-date projects are necessary, however, in order that interest be sustained. This pen stand serves as a fine introductory problem.

A feature of this pen stand is the making of the pen socket from a piece of copper tubing. This type socket may also be used on wood or metal pen stands. It is sometimes difficult, if not impossible, to purchase sockets, but this need not deter anyone from using this popular project in cement work since sockets can be so easily made.

A tin can, having a diameter of about 3¼ in., was used to make the mold for the casting the base. Remove the bottom of the can with a can opener, and then scribe a line around the can 1 in. from the rolled rim. The can should then be cut open near the vertical seam. Next, cut along the scribed line and cut away the small section of vertical seam thus leaving the circumference of the can smooth. Then bend the tin again into a true circle. To give the tin spring, so that it will stay closed at the joint, place it over some round object and tap it with a mallet. To keep the mold in shape when the form is poured, it may be tied with a string or held together with a rubber band. See *E* in Figure 1. The mold should be oiled or greased on the inside to prevent the cement from sticking to the tin and also to prevent possible rust stains in the cement. Place the mold on a piece of glass or galvanized iron, either of which will make an excellent nonwarping base.

For the socket, use ½-in. o.d. half-hard copper tubing. The extreme length of the finished socket is two inches. It is convenient and economical to make two sockets at a time, and then saw the two apart at the proper angle thus producing the two sockets with a minimum of cutting. A piece of tubing, 4¼ in. long, will make two sockets. After cutting to 4¼ in., file both ends square. The tubing should be annealed before flaring the ends. It can, however, be flared slightly without annealing if the ends are reamed quite thin with a pipe reamer. The tubing is flared as shown at *A*, in Figure 1. First hammer a ¾-in. ball bearing into the end to start the flare, and then enlarge the flare with a 1-in. bearing, or strike the end lightly with the flat end of a hammer. Regular dapping punches may be used for the flaring if they are available.

The top end of the socket may then be considered finished, but if a bead is desired as shown at *F* in Figure 1, tap the flare lightly with the hammer and then lay the tube over an anvil or piece of metal, as shown at *B* and bead the end over. At *C* is shown how the angle cuts are made with a jig. To make the cut in the center of the tube, have the tube project an equal amount beyond each side of the block. The angle may be a little less than 45 deg. The socket rests on a disk of 24-oz. sheet copper 1 in. in diameter. Drill or punch a hole through the center of the disk for an 8–32 by ⅞-in. r.h. machine screw. The tube, disk, and machine screw are soldered together as shown at *D* in Figure 1. Place two or three small pellets of solder inside of the tube and hold over heat as shown. A steady hand is required during the soldering unless some sort of steady holding arrangement other than pliers is developed. The hole for the machine screw may be drilled through the cement base and it should be counterbored at the bottom to recess the nut which holds the socket to the base.

The copper should be polished and then lacquered to prevent tarnishing. The cement may be waxed, shellacked, or lacquered.

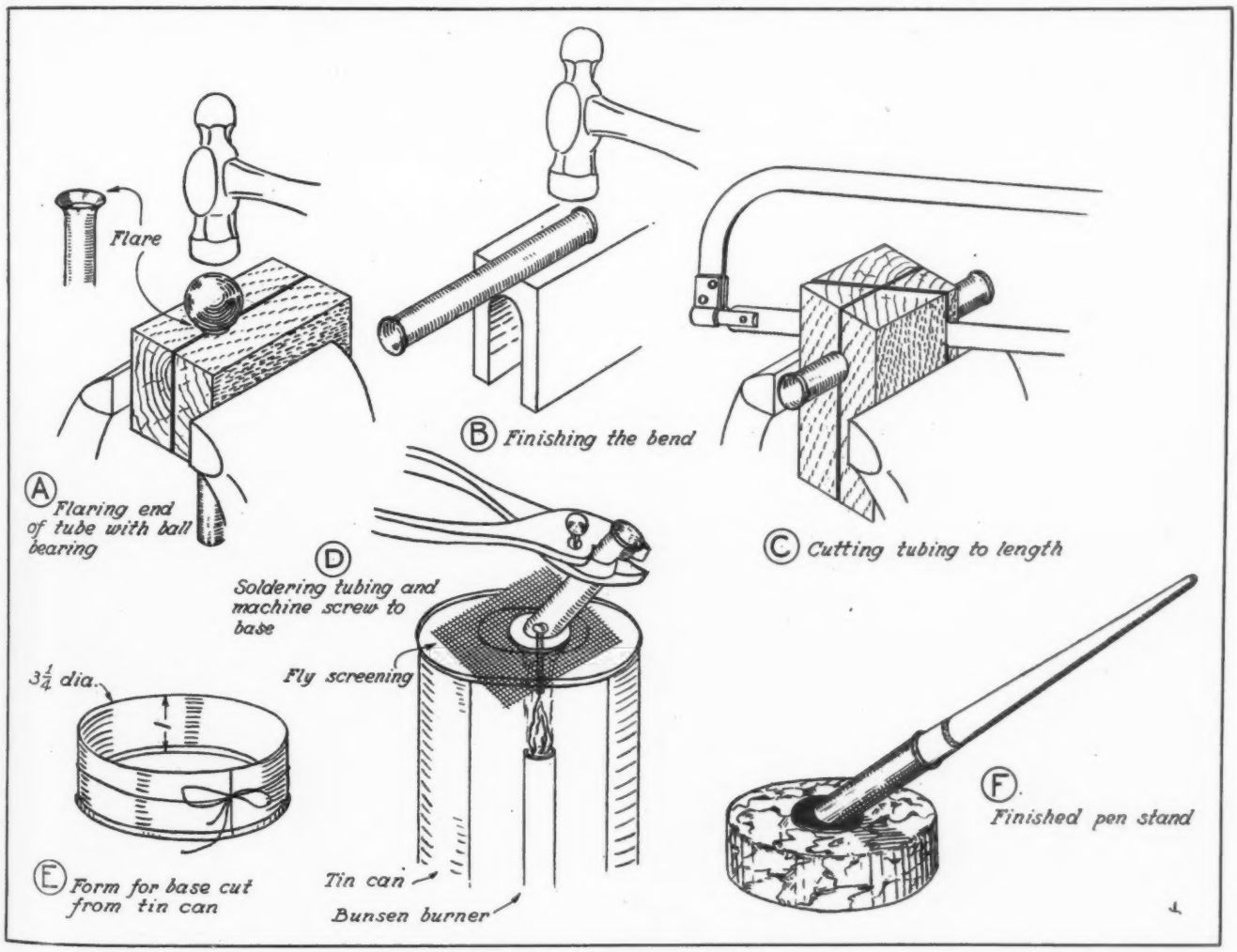
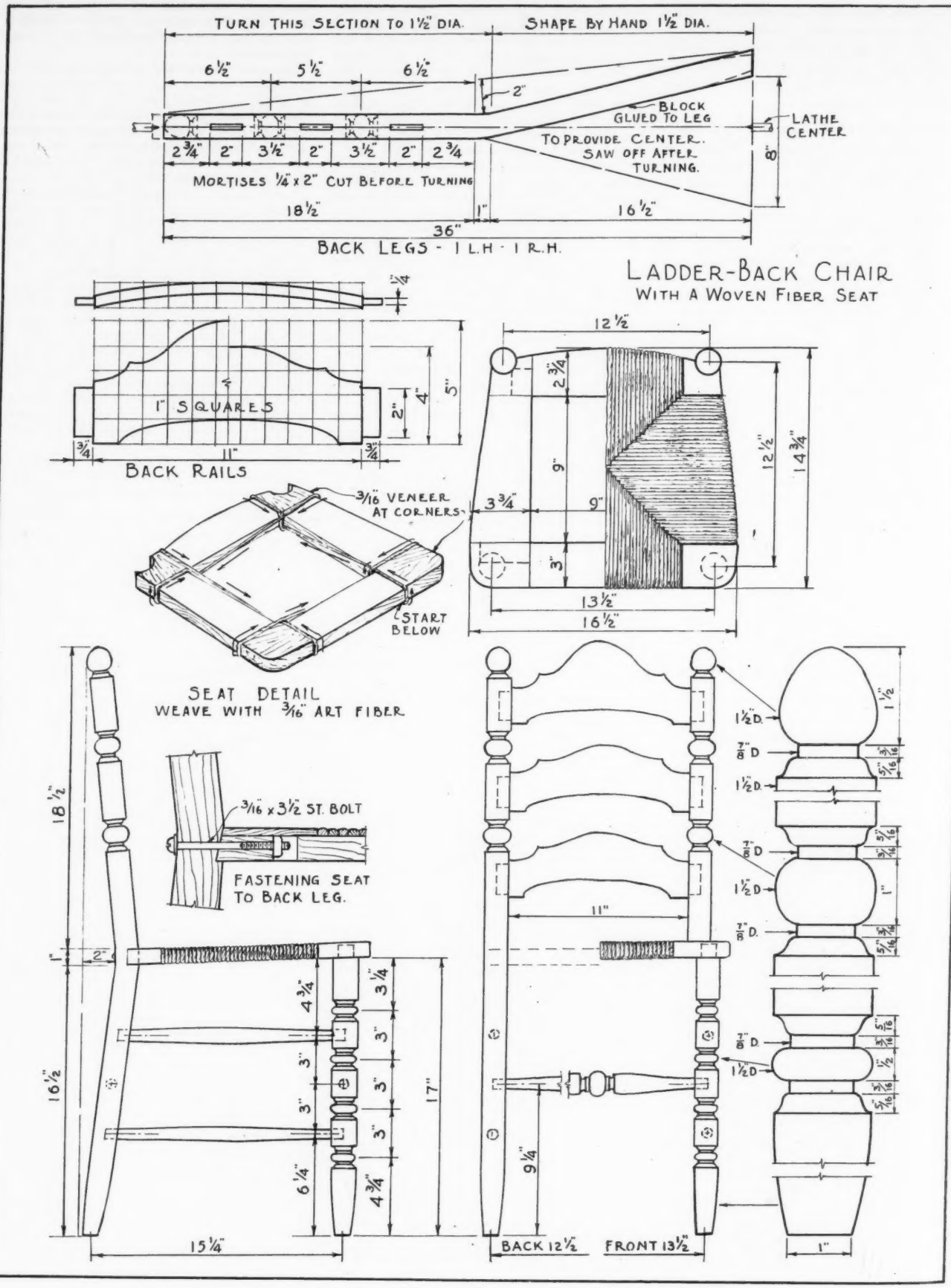

Flare
A Flaring end of tube with ball bearing
B Finishing the bend
C Cutting tubing to length
D Soldering tubing and machine screw to base
Fly screening
3¼ dia.
E Form for base cut from tin can
Tin can
Bunsen burner
F Finished pen stand

Fig. 1. Details of imitation marble pen stand



Ladder-back chair. Submitted by Chas. A. Flagg, Independent School District, Virginia, Minnesota

BOWLING PIN AS A DRAWING PROBLEM

R. R. Bedker, High School, Wauwatosa, Wisconsin

A bowling pin makes an excellent project for a drawing class. It is especially interesting if the actual bowling pin is at hand. Your local bowling-alley proprietor most likely will be pleased to loan you a pin or two for a few weeks to be used in your classes.

Specifications for A.B.C. Bowling Pins

The pins shall be of the following design and measurements: 15 in. in height, 2¼ in. in diameter at their base, 12¼ in. in circumference at a point 2¼ in. from their base, 15 in. in circumference at a point 4½ in. from their base, 11⅝ in. in circumference at a point 7¼ in. from their base, 5¼ in. in circumference at the neck, a point 10 in. from the base; 8 in. in circumference at the head, a point 13½ in. from the base.

The rim or flat portion of the bottom of pins must be ¾ in. in width with a ¾-in. cup. See Figure 2.

Sets of pins shall be of clear, hard, solid maple, and each set must be of uniform weight, the pins not to vary more than 6 oz. in any one set.

A pin must weigh not less than 3 lb., and not more than 3½ lb.

Such pins may be used that have bottoms of other foreign materials, attached at the base with plugs or otherwise, when such bottom has been so attached for the purpose of protecting the pin against wear, provided that the attached bottoms do not change the prescribed dimensions of the pins. The pins, when as above described, shall be marked A.B.C. Regulation, and have marked thereon the imprint of the "original" manufacturer thereof, and at no time may any other label be attached.

Drawing the Pin

The pin may be drawn to various scales for the sake of variety and to prevent copy-work. This makes it a very practical problem. By making a one-half template with a French curve, it is possible to get both sides alike. The template can be made of cardboard. Cut on the outside of the line and then sand down to line with a very fine sandpaper.

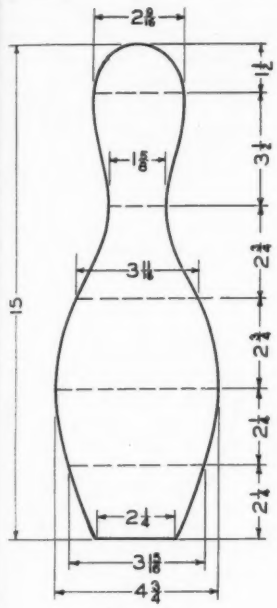


FIG. 3

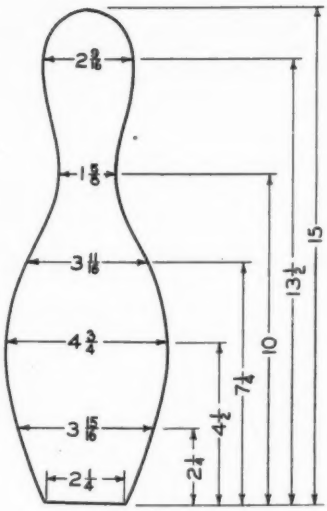


FIG. 4

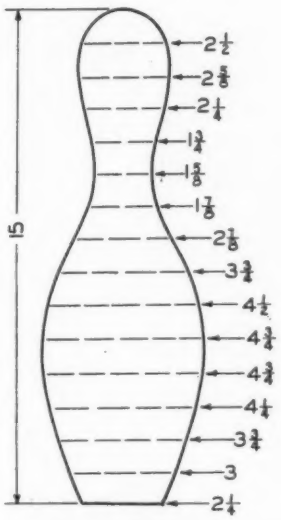


FIG. 5

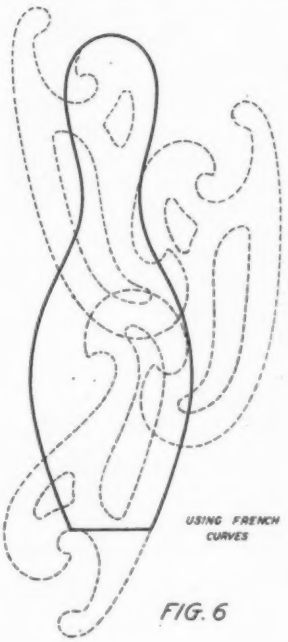


FIG. 6

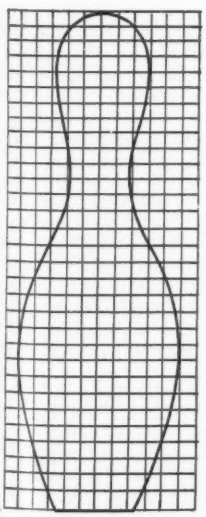


FIG. 7

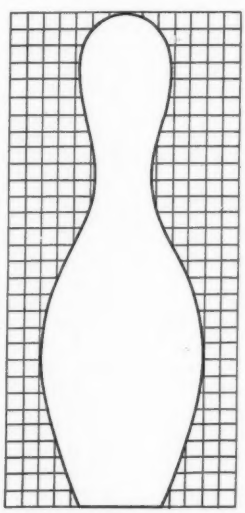


FIG. 8

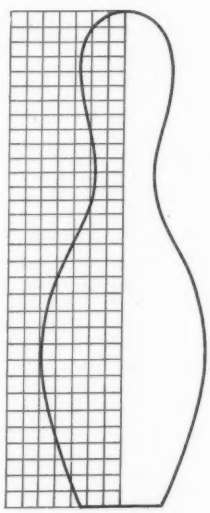


FIG. 9

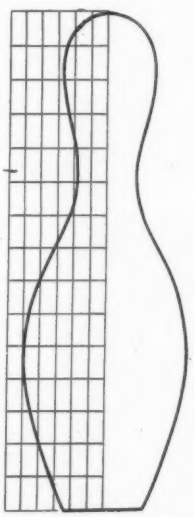


FIG. 10

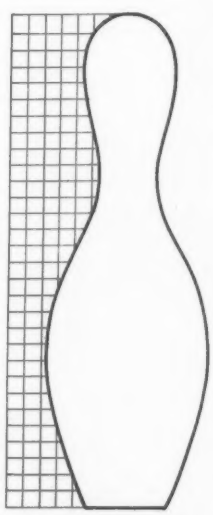
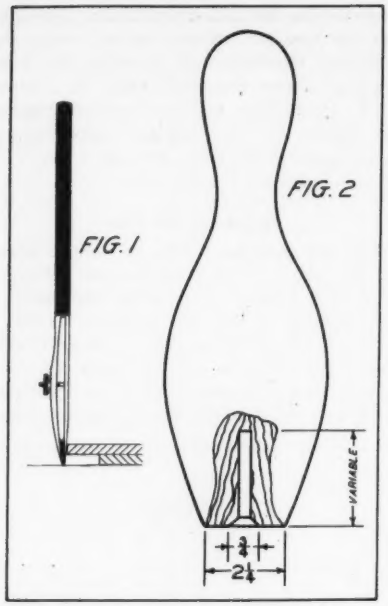


FIG. 11



Better still, use a thin celluloid sheet for templates. If the drawing is to be inked, make a smaller template to be set under the regular-size one, as shown in Figure 1. Practice using the template on scrap paper before proceeding with the regular drawing. Figures 3, 4, and 5 show how drawings of bowling pins may be dimensioned.

In using the French or irregular curve, always take in as many points at one time as possible, then move back one or two points for your next setting. Make the curve smooth. See Figure 6.

Figures 7, 8, 9, 10, and 11 show how the outline of the pin may be indicated with squares and rectangles.

MUSICAL GONG

Byron M. Taylor, Woodrow Wilson Junior High School, San Diego, California

This musical gong is designed for household use. It is superior in tonal quality and artistic appearance to the usual doorbell and therefore is a very fine substitute for it.

The gong consists essentially of an electrically operated hammer which strikes a steel bar when the doorbell button is pushed. The vibrations which are thus set up in the bar are amplified by a column of air adjusted to resonance with the bar.

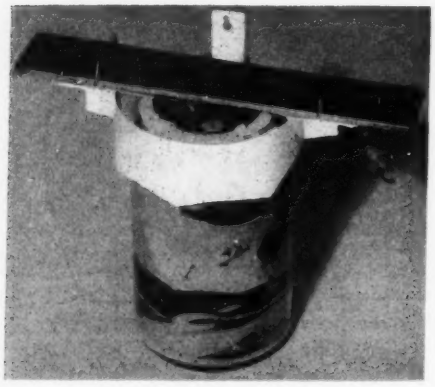


Fig. 1

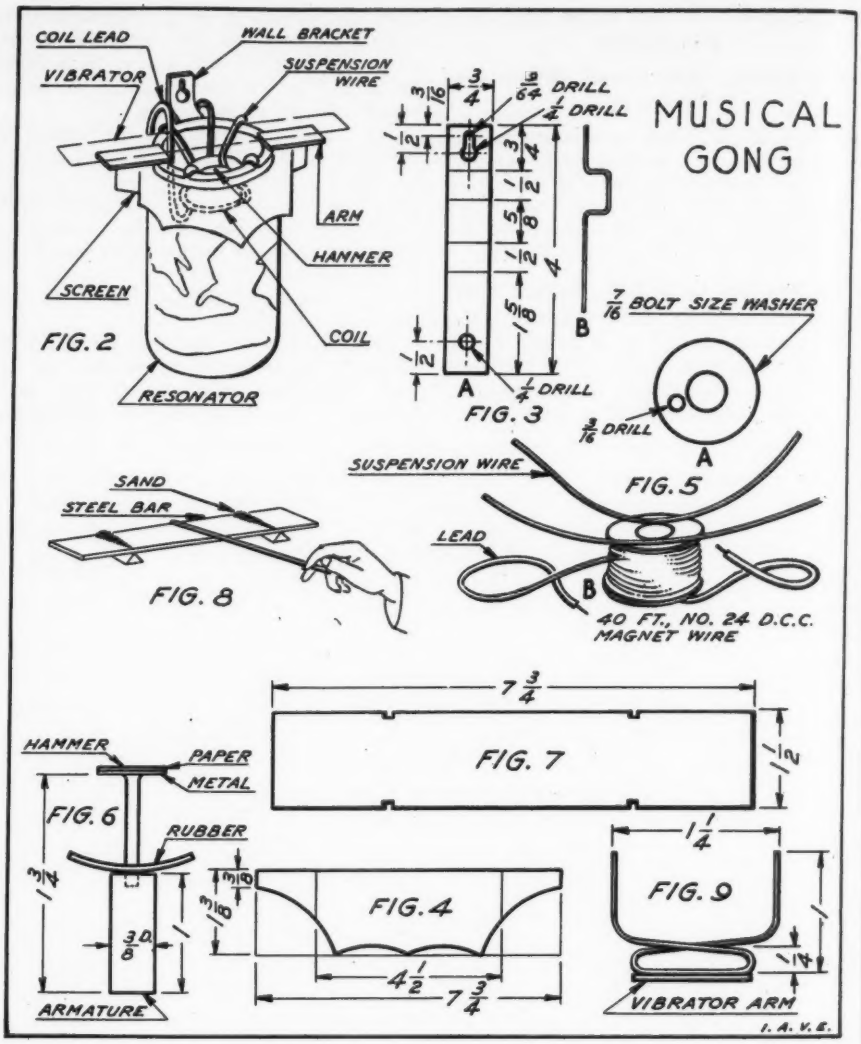


Figure 1 is a view of the gong hung on a wall above the observer's head. Figure 2 is the gong as viewed when looking down upon it and is provided to illustrate the parts of the device in relation to each other. Always refer to the drawings as the descriptive matter is read. Become familiar with both the text and the drawings before any construction is begun. If a list of tools required and materials to be obtained is made, it will be very helpful.

The Resonator. An ordinary one pint, glass "Mason" jar forms the resonator. These jars are sometimes fitted with a screw lid of two parts — a flat disk and a threaded collar. This is the most convenient type of lid to use. Discard the disk. If the type of jar used has the lid in one piece, it will be necessary to cut out the central portion leaving an inner rim of about ¼ in. on the collar thus formed. The jar may be painted or otherwise decorated. Marbled effects are obtained by dropping small quantities of lacquer of various colors in the jar and turning the jar about until the inside of the glass is completely covered. Flowered designs, colored landscapes, or the like may be affixed to the inside of the jar with transparent adhesive. Other types of decoration will, no doubt, suggest themselves.

The Wall Bracket. The wall bracket serves to support the gong on the wall. Cut out a piece of No. 16 gauge (B. & S.) sheet metal to the dimensions shown at *A* in Figure 3. Drill the holes called for. File the two upper holes to form one elongated hole. Bend to shape as shown at *B* in Figure 3. With the collar screwed down tightly on the jar, select a position for the bracket which will present the best surface of the jar to the observer, and solder the bracket to the collar of the jar.

The Vibrator Arms. These arms (Fig. 2) support the vibrator over the mouth of the jar. Cut them out of the same material that was used for the wall bracket. There are two of them, each 1 by 2 in. Solder an end of each to the top of the collar on the diameter at right angles to the line through the center of the jar and the wall bracket (Fig. 2).

The Screen. The screen is added only to improve the general appearance of the gong and may be omitted if desired. Figure 4 is a pattern for it. It may be of any sheet metal. Shape the lower edge as shown, and bend at right angles on the dot and dash lines. Solder the screen to the back of the arms as seen in Figures 1 and 2.

The Coil Assembly. At *B* in Figure 5 is shown a perspective of the coil assembly. The projecting heavy wires are for suspending the coil in the jar. To make the coil bobbin, obtain two standard 7/16-in. cut wrought-steel washers and drill in one the

hole shown at *A*, Figure 5. (NOTE: These washers have ½-in. holes and are 1¼-in. o.d.) For the mandrel, use a 1 in. length of ½-in. o.d. brass tube No. 19 Stubs' gauge walls. Solder the washers on the ends of the tube. Obtain two pieces of No. 14 gauge wire about 5 in. long. Solder them to the side of the bobbin in which no hole was drilled, as shown at *B* in Figure 5. Wrap 10-mil. fish-paper around the mandrel, and shellac the insides of the washers. Secure about 40 ft. of No. 24 d.c.c. magnet wire. Begin by soldering a 10-in. lamp-cord terminal lead to the magnet wire. Tape the joint. Thread the lead through the washer and wind. At the finish of the winding, splice on another piece of lamp cord. Catch the lamp cord in the half hitch used in finishing the winding.

The Armature and Hammer. The armature is shown in Figure 6. It consists of a piece of ⅜ by 1-in. soft round iron rod. Drill one end centrally with an ⅛-in. hole about ⅛ in. deep. Into this hole, solder a ⅞-in. length of ⅛-in. diameter brass or copper rod. Solder a metal head on the rod consisting of a disk ⅜ in. in diameter. Take a 1-in. disk of rubber (a piece of old inner tube) and cut a 3/16-in. hole in the center. Slip this over the armature as shown in Figure 6. Cement a disk of thick paper or thin cardboard to the top of the hammer head. See Figure 6.

Assemble Coil and Collar. Fit the coil centrally in the jar and so that the head of the hammer is ¾ in. below the rim on the collar. When the coil is in position, solder the four suspension wires to the rim, as shown in Figure 2, and cut off the surplus wire. Bring the coil leads out in the back and tape them to the wall bracket.

The Vibrator. The vibrator is a hard, polished steel bar or plate — preferably of flat tool steel, of the size shown in Figure 7. The length of the bar that will vibrate in resonance with the air column in the jar depends on a variety of factors. Resort is then had to experiment in the adjustment of these factors.

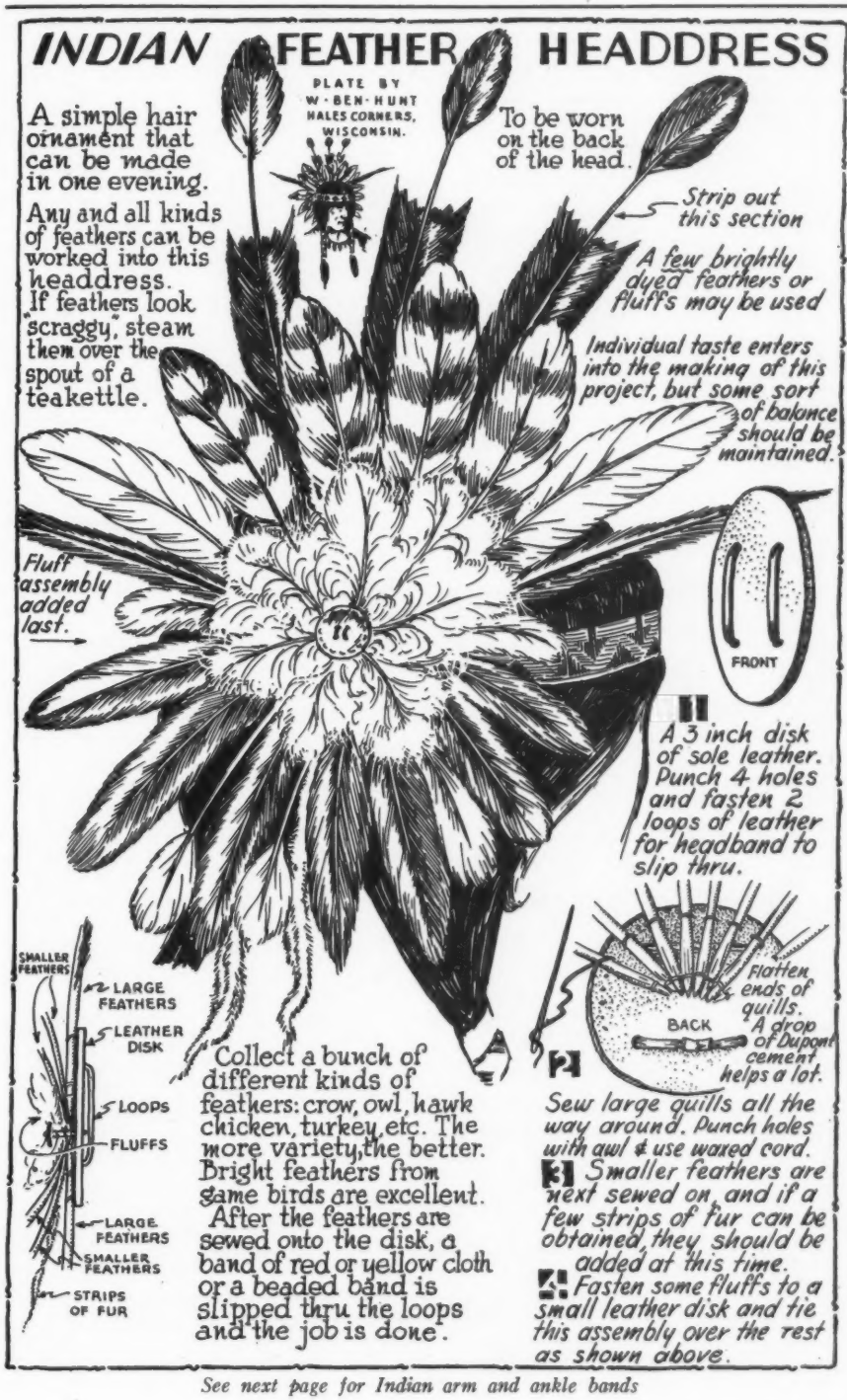
Lay the bar selected on a horizontal surface supported on two triangular pieces of wood as on knife edges (Fig. 8). The supports should be placed about ¼ of the total length of the bar from each end. Spread fine sand on the bar. With a heavy pencil — or the like — tap the center of the bar lightly and rapidly. The sand will be jarred from the surface of the bar except at two small areas in the neighborhood of the supports. If the wooden pieces are raised so as to tip the bar sidewise, the sand will arrange itself in triangular cones as seen in Figure 8. The point of these cones locates a node of the bar for this method of suspension. Now, transfer the bar and supports to the vibrator arms and tap the center of the bar as before. Note the sound emitted. Pour a little sand into the jar and spread it evenly on the bottom. Note the response again. If it is not clearer and more sustained, cut about ½ in. off the bar. Again locate the nodes and repeat the test. It may be necessary to cut off a little more. If at any time too much is cut off, the resonant condition can be restored by adding sand to the jar. By varying the exact position of the supports and the amount of sand in the jar, arrive at the best results. Having found the best node, scribe on the bar the places where the wooden knife edges touch. At the same time, scribe on the vibrator arms the points immediately under the knife edges. At these latter points solder the vibrator supports.

Vibrator Supports. The vibrator supports are made of No. 18 hard drawn wire shaped as shown in Figure 9. Two pieces of wire 6 in. long will suffice. To secure each support to its arm, lay the wire loop on the arm (with the ends vertical) and solder it at the point previously located.

Assembly. Drop the armature in the coil. File the slots in the edges of the vibrator bar for the ends of the supporting wires. See Figure 7. Place the bar on its supports. The slots should be wide enough so as not to bind the wires, thus leaving the bar quite free. Turn the ends of the wires over and inward so that the vibrator cannot be accidentally dislodged.

Finish. Paint or lacquer all exposed parts, with the exception of the vibrator bar. Treat the vibrator bar with oil.

Operation. There is a final adjustment which had, perhaps, better be undertaken when the gong is hung in its chosen location. Unscrew the resonator jar and fasten the bracket to the wall with screws. Replace the jar. Place the bar in its supports and connect the terminals of the coil to the bell-circuit wires. When the push button is pressed, the hammer should strike the bar and rebound with a clearance in respect to the bar of about ¼ in. To obtain this clearance, the vibrator supports may be bent to raise or lower the vibrator until the proper clearance is obtained.


INDIAN FEATHER HEADDRESS
PLATE BY W·BEN·HUNT HALES CORNERS, WISCONSIN.
A simple hair ornament that can be made in one evening.
Any and all kinds of feathers can be worked into this headdress. If feathers look "scraggy", steam them over the spout of a teakettle.
To be worn on the back of the head.
Strip out this section
A few brightly dyed feathers or fluffs may be used
Individual taste enters into the making of this project, but some sort of balance should be maintained.
Fluff assembly added last.
FRONT
1 A 3 inch disk of sole leather. Punch 4 holes and fasten 2 loops of leather for headband to slip thru.
2 Flatten ends of quills. BACK A drop of Dupont cement helps a lot.
Sew large quills all the way around. Punch holes with awl & use waxed cord.
3 Smaller feathers are next sewed on, and if a few strips of fur can be obtained, they should be added at this time.
4 Fasten some fluffs to a small leather disk and tie this assembly over the rest as shown above.
SMALLER FEATHERS
LARGE FEATHERS
LEATHER DISK
LOOPS
FLUFFS
LARGE FEATHERS
SMALLER FEATHERS
STRIPS OF FUR
Collect a bunch of different kinds of feathers: crow, owl, hawk chicken, turkey, etc. The more variety, the better. Bright feathers from game birds are excellent. After the feathers are sewed onto the disk, a band of red or yellow cloth or a beaded band is slipped thru the loops and the job is done.

See next page for Indian arm and ankle bands

FLATIRON CANDLESTICK

Leon H. Baxter, Association for Crippled and Disabled, Cleveland, Ohio

The flatiron candlestick described and illustrated herewith, has one unique feature. It may be carried about by grasping the handle or it may be hung up by drilling a 3/16-in. hole at *X* (see front view, Plate 5), and suspending it from a brass nail or screw in the wall. The candle swings easily on the supporting arms, and maintains an upright position at all times.

The base *A* is made from a piece of 4⅞ by 5⅞ in. 16-gauge copper. Lay out the pattern for the base according to the dimensions in Plate 5. Transfer the pattern to the metal by scribing and cut out the shape with a pair of tinner's snips. File all edges smooth. Planish the top surface and edges with a planishing hammer.

Next, make the two supporting uprights *B*, from 16-gauge copper ¾ in. wide by 4⅛ in. long. Bend the ends at right angles, and smooth all edges with a file. Planish on both surfaces and edges.

Locate and drill the center hole for the swinging member *E*. The handle *G* is made of a piece of ¾ by 7½ in. 16-gauge copper. Shape the two ends as shown in Plate 6. Locate and drill a 3/16-in. hole near the one end, and drill two ⅛-in. holes for the rivets near the other. Bend the handle to a uniform curve similar to the one shown, taking pains that the two flat ends are in a straight line. Place the handle in position on base *A*, mark the rivet holes, and drill these in the base. Then fasten base and handle together with copper rivets.

Place the two uprights *B* in position, locate the holes for the ⅛-in. rivets, drill the holes and fasten base and uprights together with copper rivets.

The candleholder *F* is made of a piece of 1½ by 2⅞ in. 18-gauge copper.

Square all edges and planish one surface. Bend into cylindrical form and solder as described on pages 305 and 306 of the September, 1938, issue of this magazine.

BEADED • ARM • BANDS
This one is made of tubular beads with leather spacers to keep the rows in place.
First cut this arm band out of a piece of soft leather, leaving ends long enough for tying.
TUBULAR BEAD
LEATHER SPACER
After one row of beads is strung, try it on the arm to see if it fits properly. Use waxed linen thread.
The beads can be sewed directly onto the leather as shown at X, or they can be woven on a bead loom and sewed onto the leather later. Unless leather is very thin, use an awl.
FEATHER • ARM • ORNAMENTS
LEATHER DISK
SOFT LEATHER BAND
TIN DISK
1- Cut a 2½ or 3-inch disk of rawhide or sole leather
2- Soak it in water and form it into a saucerlike shape. Let it dry this way.
3- Punch holes and fasten loops for leather band.
4- Large feathers are now sewed all the way around. A drop of Duponi cement will hold them until then. A second row of small fluffs are next fastened in the same manner, with a drop of cement and one stitch.
5- A small tin disk is then tied over the center. It may also be fastened to a wide elastic arm band.
Finished ornament to be about 5" in diameter.
SLEIGH • BELL • LEG • BANDS
KNOT
Sleigh bells form an important part of most of the Indian dances. Their rhythmical jingling coupled with the steady beat of the tom-tom is enough to stir the blood of anyone. The drawing shows how these bands are usually made, although they may be fastened in any simple manner.
This type of bell can usually be obtained in children's toy departments.
These bands are worn tight below the knee or loosely at the ankle.
TIN • CONE • ANKLE • BANDS
These cone anklets emit a very pleasant tinkling sound, especially if enough cones are used. There should be about 30 or 40 on each band. They can be fastened to the buckskin thong as shown below or by crimping with a nippers.
These patterns are actual size. Tin, brass or copper may be used.
Use long cones on one and short ones on the other
Cones can be shaped over the end of a center punch.

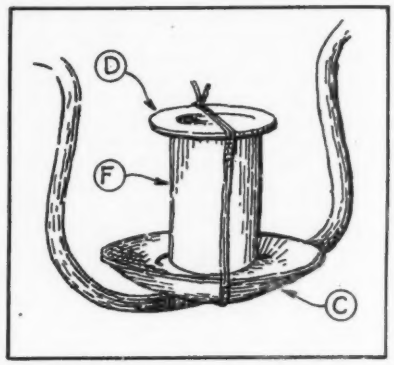
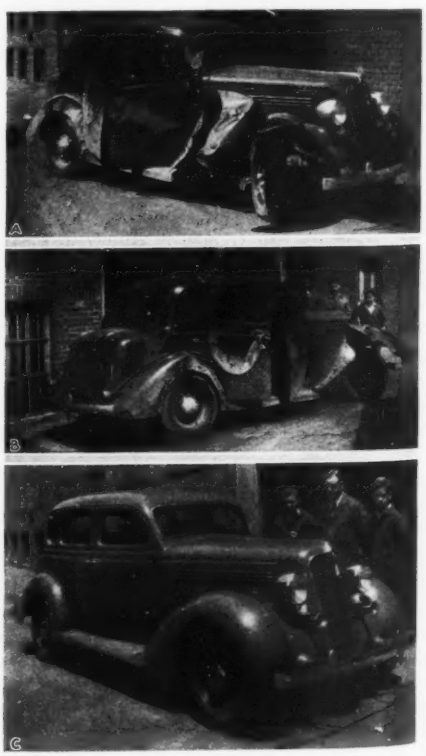


Fig. 13. Wiring drip pan, holder, and lower pan for soldering



A. The car as it looked when it was brought in to the auto-fender and body-repairing shop of the Hower Vocational School, Akron, Ohio. B. Another view of the same car. C. The same car after having been repaired and repainted by the students, under the direction of Ray K. Scheib, instructor.

Make the drip cup *D* of 18-gauge copper. Scribe and cut a hole in the center to fit the inner diameter of holder *F*.

Planish on surfaces and edges, and form the cup-shaped depression in a lead block as shown. Pan *C* is made from a piece of 18-gauge copper 2¼ in. in diameter and planished on both surfaces and edges, and cupped out in a similar manner.

Swinging member *E* is a ¼-in. copper rod, 10 in. long. Planish this rod all over and anneal. Draw a full-sized layout of the curve to which this member is to be bent, and form the rod over a cylinder or anvil horn to fit this layout. After both halves are evenly and symmetrically formed, file a shoulder on both ends of a length that will just extend through the two uprights *B*. Member *E* should swing easily between these supports.

Drill a ⅛-in. hole exactly in the center

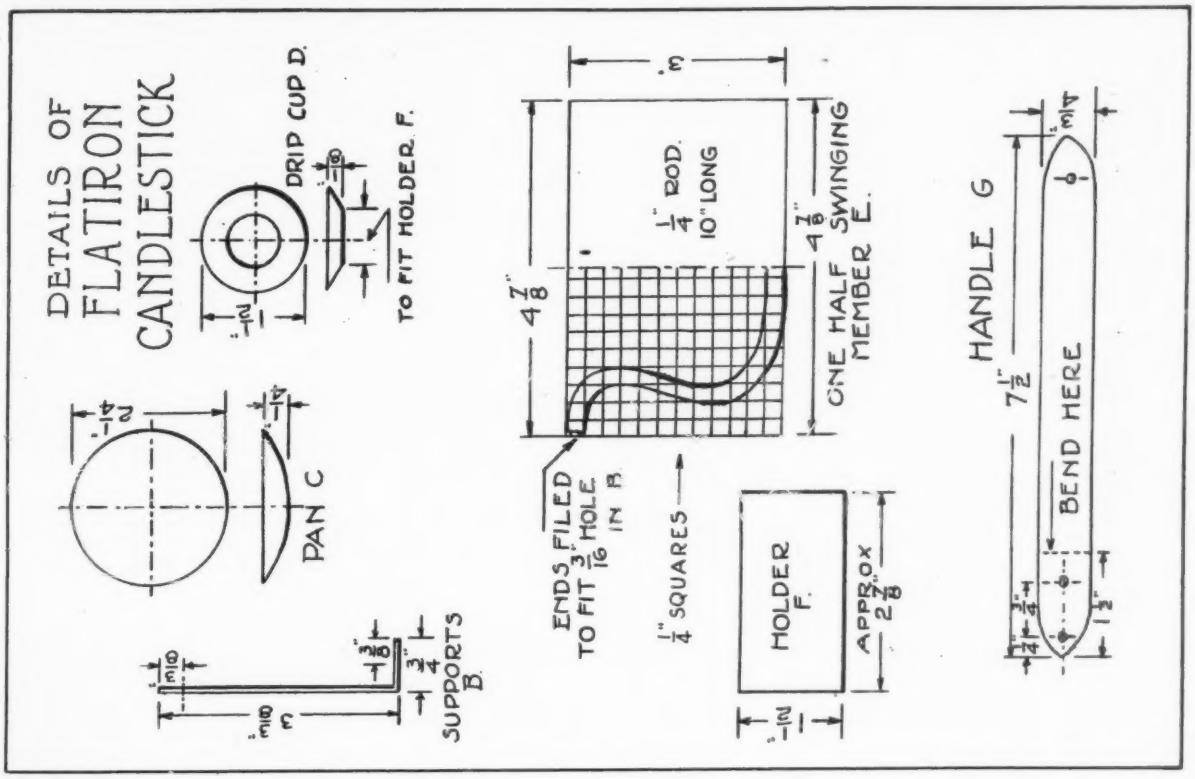


Plate 6

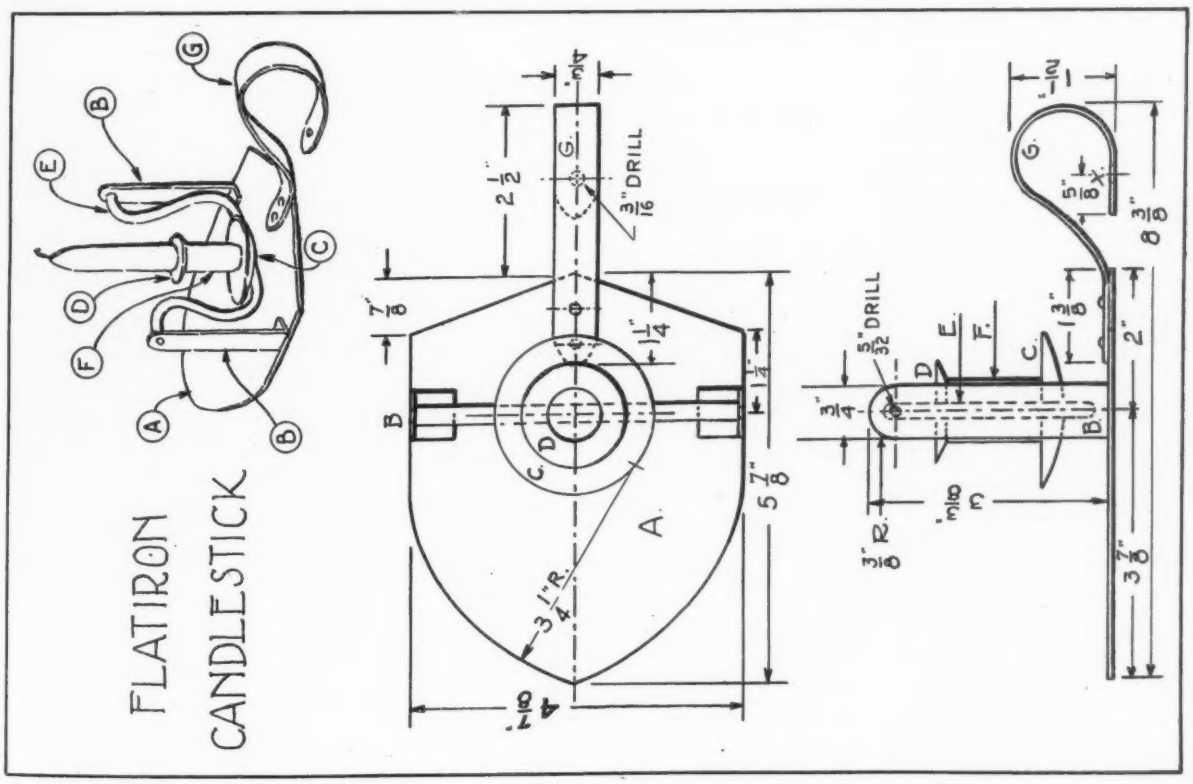


Plate 5

of the pan *C* to coincide with a similar hole bored at the center point of the swinging member and rivet the two together securely.

Place holder *F* directly in the center of pan *C* with flux and small pieces of solder on the inside edge of *F*. Place drip cup *D* on top of *F*. Wire these pieces together as shown in Figure 13 and solder securely in place by first applying heat at the bottom, then turning the parts upside down and soldering *D* to *F*.

Clean all parts with fine steel wool and snap *E* into the uprights *B*. Fume as described under *finishing* on page 306 of the September, 1938, issue. After removing from the fuming jar, rub lightly with fine steel wool to bring out the high lights, and then polish with wax.

Answers to Questions

REMOVING GOLD LEAF

1041. Q.: I wish to remove gold leaf from a carved table. What solvent can I use to accomplish this? — *B. G.*

A.: No solvent will remove the gold leaf; only a thorough sanding with a 3/0 finishing paper and a small stick backed with a piece of glove leather. — *Ralph G. Waring.*

WOODS AND FINISHES FOR SILHOUETTES

1049. Q.: Will you please inform me as to the best method of producing the jet or flat black finish used on novelty plywood cutouts or silhouettes. Which makes the better base, birch or bass plywood? — *T. C. D.*

A.: For cutouts, use birch plywood face, in view of the fact that this wood is by far the harder. For the finish, simply dip the cutouts in a dilute solution of black lacquer. For dead flat or dull effects, use a flat lacquer. — *Ralph G. Waring.*

MOTHPROOFING CHESTS

1050. Q.: I should like to know if there is some finish that may be put on wood chests other than cedar that will render them moth-proof. — *C. H. P.*

A.: To treat the inside of chests made of woods other than cedar, brush on a coat of the following solution and leave closed for two days, then open for one-half day, before closing for long intervals.

To one pint of good quality grain alcohol add 1 oz. of oil of cedar as purchased from any good drugstore. Denatured alcohol may be used if it is free of objectionable odor. Brush on freely with a clean brush and let stand as directed. Do not give any subsequent coatings. Any finish may, of course, be applied to the outer faces. — *Ralph G. Waring.*

FINISHING DESK TOPS

1051. Q.: After we have sanded birch desk tops which we wish to finish in shellac and wax, what do we use for stain to get the right shade of "schoolroom brown"?

A.: If you will write to Mr. J. W. Lippitt, 10 Grand Blvd., Binghamton, N. Y., he will be able to supply you with the correct color in a nongrain-raising water stain which will give you very high-grade results. He is the factory representative of the Woodfinishing Products Co. of New York.

I seriously question your judgment in advocating the use of shellac and wax on school desks as I am definitely of the opinion that such a finish will not last out a single term. Some twenty-five years experience in this field lead me to suggest that you change to a high-grade floor varnish of the 4-hour type such as Pratt and Lambert Co., Buffalo, N. Y., No. 61 floor varnish. Two coats, the first applied as one part turpentine (pure) to two parts of varnish. Dry three days and sand with No. 4/0 paper, then tack rag and revarnish full body. This coat should dry a week and may then have the gloss cut off to produce a high-grade finish if rubbed with No. 2/0 steel wool pads packed full of floor wax. Be very careful to rub only in straight lines the full length of the top. Give a final lengthwise rub with clean, dry cloths. — *Ralph G. Waring.*

REFINISHING A HITCHCOCK CHAIR

1046. Q.: Can you tell me how I may refinish an old chair of the Hitchcock type? The original finish seems to be a black paint grained over a deep brown or maroon; the design is stenciled in bronze shades and seems to be shaded out in parts. — *L. V. J.*

A.: The method of decorating Hitchcock chairs which you mention involves the use of a series of stencils, generally quite elaborate in design. The ground coat or primer is laid on, dried and sanded; over this is brushed a coat of 4-hour black enamel which is sanded smooth when dry and hard, using No. 6/0 paper. Stencils for the outline of the main design are then cut, held firmly in place with pieces of adhesive tape and the fingers dipped into a well stirred or spatulated mixture of gold bronze in gold-size Japan. This is then worked back and forth over the openings in the stencil until the pattern is entirely blocked in. The stencil is carefully removed so as to avoid smearing the edges and the gold background allowed to dry. The overlay stencil is now cut to outline the black or shaded portion of the pattern. The stencil is applied to the well-dried gold background and the finger or a rag, preferably the finger is used to wipe in the black overlay. Remove the stencil as soon as possible and use a sable or ox-hair brush to blend out edges of black in form of shading or fogging. When dry, give entire job a third coat of clear 4-hour varnish.

This treatment may be varied infinitely through the use of color; although Hitchcock confined himself almost entirely to the use of silver and gold bronzes, the latter, being of the Roman, Chinese, and red gold varieties. Designs in considerable detail are given in the February, 1937, issue of *School Arts*, 647 Printers Bldg., Worcester, Mass. — *Ralph G. Waring.*

Personal News

• LEONARD LARSON, Litchfield High School, Litchfield, Minn., a graduate of the University of Minnesota has accepted a position as related-subjects teacher at Wilbur Wright Vocational High School, Detroit, Mich.

• ROBERT BENSON, industrial-arts instructor at the Jefferson Intermediate School, Detroit, Mich., has been promoted to counselor at that school. SHIRLEY OWEN who had been acting in both capacities, is head of the vocational department.

• HENRY VOZKA has been appointed as a counselor at Western High School, Detroit, Mich.

• WESLEY REA has accepted a position as a counselor at the Southeastern High School, Detroit, Mich.

• JOHN V. TRYBOM, director emeritus of vocational education for the Detroit Public Schools, received hundreds of letters, cards, and telegrams congratulating him on his recent 72nd birthday.

• Dr. Warren E. Bow, assistant superintendent of Detroit schools, acted as chairman at one of the afternoon sessions of the Progressive Education Association meeting held in Windsor, November 18 and 19. Dr. C. L. Cushman, Denver Public Schools, was the principal speaker. The convention theme was "Building for the Needs of the Individual."

• Secretary of the Interior, Harold L. Ickes, has announced the appointment of two consultants to the staff of the Office of Education, Department of the Interior. Charles N. Fullerton, Washington, Ind., was named Consultant in Employee-Employer Relations, and Lyman S. Moore, of Chicago, Ill., was appointed as Consultant in Public Service Occupations. Both men will work in the vocational-education division of the Office of Education under the immediate direction of J. C. Wright, Assistant Commissioner for Vocational Education.

• PROFESSOR EDWARD H. JONES, Head of the Agricultural Education Department of the North Dakota Agricultural College and State Supervisor of Vocational Agricultural Education, passed away unexpectedly at his home in Fargo, September 17.

Professor Jones was a pioneer in vocational agricultural education. He organized and supervised the vocational agricultural education program in North Dakota from the start after the passage of the Smith-Hughes Act. Serving as head of the Agricultural Education Department at the North Dakota Agricultural College, he was directly in charge of training vocational agricultural instructors. Two years ago, Professor Jones was placed in charge of the School of Education.

Association News

♦ The very successful 1938 American Vocational Association convention closed Saturday, December 3, 1938. The officers of this Association, the local and other committees who made this convention possible deserve a vote of thanks for the efficiency with which the convention was conducted.

It is, of course, impossible to report on a convention as huge as this with any degree of completeness. Edwin A. Lee, Director of the National Occupational Conference and Professor of Education, Teachers College, Columbia University, New York City, in his address *Our Need for Vocational Guidance,* emphasized the need for training for educational competency. Occupational adjustment does not consist of unrelated vocational guidance, occupational training, and then finding a job, but it must be made a continuous process which must follow a student through stage after stage of placement until he has been successfully inducted into the work for which he has been trained.

Paul W. Chapman, Dean of the Georgia State College of Agriculture, Athens, Ga., spoke on *The Establishment of the Vocational Information and Guidance Service in the Office of Education.* He pointed out that this national service will eventually provide a true picture of what trainees of vocational education have obtained through the vocational courses that are offered the country over.

Aubrey Williams, Director of the National Youth Administration, Washington, D. C., unfortunately could not be at the meeting, but a

(Continued on page 14A)

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1—10" Tilting-arbor saw, with motor	$138.25
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1—14" Drill press, with motor	65.70
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1—12" Wood-turning lathe, with stand	70.95
Motor	23.85
TOTAL	$557.40

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Standardize on STARRETT TOOLS

(Continued from page 44)

short paper written by him was read at the meeting, in which he advocated centers to determine by actual experiences whether youth will profit by apprenticeship or vocational courses to enter specific jobs.

A. K. Getman, State Supervisor of Agricultural Education, Albany, N. Y., gave a short report on the research activities carried on by our Association.

The industrial-arts section meetings were exceedingly well attended. At the one held Thursday morning, D. M. Schweickhard, Assistant Superintendent of Schools, Minneapolis, Minn., presided.

Edwin A Roberts, Director, Department of Practical Arts, Rochester, N. Y., gave an excellent talk on *The Organization of Instruction Material from the Standpoint of the Director*. This he illustrated by large charts excellently made, each of which carried the story well.

Claude E. Nihart, Supervisor, Vocational and Practical Arts, Los Angeles, Calif., spoke on *Trends in Industrial Arts in California*. He pointed out the close relationship between industrial arts and vocational education, and gave a general survey of the work offered in this line in the various cities of the state.

R. A. Hinderman, Director, Industrial Arts and Vocational Education, Denver, Colo., spoke on *Industrial Arts and Industrial Society*. He emphasized the need of close relationship between industrial arts and the industrial society in which we are living; that industrial-arts teachers must be carefully selected and broadly educated so that they can carry their industrial-arts curriculum far beyond the walls of their classrooms. He also advocated the use of films of the state and community resources to help the teacher keep himself and his students abreast of the times.

The combined section meeting held Thursday afternoon was under the chairmanship of Ruth Freegard, Chief, Homemaking Education Division, State Board of Control for Vocational Education, Lansing, Mich. At this meeting, Frederick B. Knight, Director, Division of Education and Applied Psychology, Purdue University, Lafayette, Ind., spoke on the *Strengths and Weaknesses of Industrial Education*. He pointed out that the main strength of vocational education is that it really matters. He also said that we as teachers must change continually. The theory that boys and girls must learn to earn their living by the sweat of their brows must be uppermost in our minds.

John T. Wheeler, Professor, Agricultural Education, University of Georgia, Athens, Ga., spoke on *The Expanding Program in Vocational Agriculture*. He said that the fact that farm tenancy largely takes the place of farm ownership, must be reckoned with, and that what we now need are greatly expanded programs of agricultural education.

George P. Hambrecht, State Director, Vocational and Adult Education, Madison, Wis., spoke on the *Out-of-School Youth Problems* confronting part-time schools. He showed that part-time school contacts must be made exceedingly flexible to fit these times where so many of the youth between 16 and 25 are out of school and unemployed.

Edna Amidon, Chief, Home Economics Education, U. S. Office of Education, Washington, D. C., spoke on the *Significance of Homemaking Education — Today and Tomorrow*.

Frank C. Moore, Director, Industrial Arts, Cleveland, Ohio, discussed the *Trends in Industrial Arts*. He strongly emphasized that industrial-arts work should start in the elementary school in the lowest grades, and that they should be taught in separate rooms, preferably by women; that the industrial arts in the junior high school should provide opportunities for the child to explore many areas, and that he be given opportunity to evaluate his own personality and discover his own attitude and aptitude.

George E. Hutcherson, Chief of Guidance Bureau, State Department of Education, Albany, N. Y., spoke on *The Changing Conceptions of Guidance*. He pointed out that guidance in school must be predicated on the thought that there are no misfit students. There may be misfit courses, misfit textbooks, but no misfit children.

Reta Mitchell, State Director, Vocational Rehabilitation, Jefferson City, Mo., spoke on *The Overview and Trend of Civilian Rehabilitation in an Adequate Vocational Program*. He pointed out that in the State of Missouri there are approximately 300,000 disabled persons; that one out of eleven families on relief is so because the breadwinner is disabled or physically handicapped. Vocational rehabilitation, therefore, requires intensive casework to determine the best course to pursue for such disabled persons.

At the Friday morning session, safety in the school shop was discussed. John J. Metz, Editor, INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, Milwaukee, Wis., was the chairman. Earl L. Bedell, Director, Vocational Education, Detroit, Mich., discussed the topic from the viewpoint of *Safety Instruction — A Social Obligation*. He opened up the broad field which this important subject has in our school shops.

Roy A. Radtke, Supervisor, Industrial Arts, Milwaukee, Wis., continued with *Safety — An Integral Part of the Industrial-Arts Curriculum*. In his talk, he outlined what is being done in Milwaukee in and out of schools to make safe citizens out of the students.

William A. Sears, Director, School Safety, Chicago, Ill., described in a comprehensive way what Chicago is doing to give safe driving habits to its many high-school students.

The discussion leader, Charles F. Bauder, Director, Industrial Arts, Philadelphia, Pa., rounded up the discussions exceedingly well and the speakers were asked many questions by an exceedingly interested audience.

Verne L. Pickens, Supervisor, Industrial Arts, Kansas City, Mo., was chairman of the Friday afternoon session, at which time Harry E. Wood, Director, Practical Arts and Vocational Education, Indianapolis, Ind., in his usual able and interesting way, spoke on *Art Metal and Jewelry*, illustrating his talk with many sketches.

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16" x 6' with 2 H.P. motor and control $1100.00
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John W. Dougherty, Director, Industrial Arts, Oakwood Schools, Dayton, Ohio, spoke on *Teaching Pottery in the High School*, and Guy A. Pratt, Teacher of Bookbinding, East Chicago, Ind., on *Bookbinding as an Industrial-Arts Subject*. These three talks on the artistic crafts for the high school created quite a bit of interest.

At the Saturday morning session under William T. Bawden, Head, Department of Industrial and Vocational Education, Kansas State Teachers College, Pittsburg, Kans., a panel symposium was given on the subject *Some Obstacles to Be Overcome in Promoting an Adequate Program of Industrial Arts*. Members of the panel were: Elmer W. Christy, Supervisor Industrial Arts, Cincinnati, Ohio; Allen T. Hamilton, State Supervisor of Industrial Education, Indianapolis, Ind.; Roy A. Hinderman, Director, Industrial Arts and Vocational Education, Denver, Colo.; Hoyt H. London, Assistant Professor of Industrial Education, University of Missouri, Columbia, Mo.; R. B. McHenry, Director, Industrial Education, Fort Smith, Ark.; Harry W. McKimmey, Co-ordinator, Central High School, Oklahoma City, Okla.; Verne L. Pickens, Supervisor, Industrial Arts, Kansas City, Mo.; E. E. Ericson, Director, Industrial Education, Santa Barbara State College, Santa Barbara, Calif. The large audience in attendance entered quite freely into the deliberations.

A testimonial luncheon was given in honor of Charles A. Bennett, that well-known pioneer and historian of industrial-arts education, at 12:30 p.m. on Saturday. George H. Hargitt, Supervisor Industrial Arts, St. Louis, Mo., was chairman, and the toastmaster was the genial Homer J. Smith, Professor, Industrial Education, University of Minnesota, Minneapolis, Minn. Brief addresses on this occasion were given by the following: E. E. Ericson, Director, Industrial Education, State Teachers College, Santa Barbara, Calif.; Robert W. Selvidge, Professor of Industrial Education, University of Missouri, Columbia, Mo., Thomas H. Quigley, past president of the American Vocational Association, Georgia School of Technology, Atlanta, Ga.; John J. Metz, Editor, INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, Milwaukee, Wis.; William T. Bawden, Head, Department of Industrial and Vocational Education, Kansas State Teachers College, Pittsburg, Kans., after which Charles A. Bennett responded.

In spite of the fact that most of those in attendance at the convention left St. Louis at noon or shortly thereafter, a record-breaking attendance marked this testimonial luncheon. A large number of congratulatory telegrams and letters were received by Mr. Bennett.

The industrial-education section at the Wednesday morning meeting was presided over by H. H. Widdowson, State Supervisor, Trade and Industrial Education, Minneapolis, Minn. At this meeting, E. E. Gunn, Jr., Assistant State Director, Vocational and Adult Education, Madison, Wis., presented a paper on *Legislation Affecting Trade and Industrial Education*. Further discussion was held on *Problems in the Field of Trade and Industrial Education from the Standpoint of State Supervision*.

A joint luncheon of the National Association of State Supervisors of Industrial Education and the National Association of Industrial Teacher Trainers also was held on Wednesday. The discussion at this time was centered on *What Lies Ahead in Industrial Education*.

At the National Association of Industrial Teacher Trainers meeting Wednesday afternoon, George E. Myers, Professor of Vocational Education, University of Michigan, Ann Arbor, Mich., was the chairman. M. Norcross Stratton, Assistant Director, Division of Vocational Education, State House, Boston, Mass.; Cleo Murtland, Associate Professor of Industrial Education, University of Michigan, Ann Arbor, Mich., and Lynn A. Emerson, Professor of Industrial Education, Cornell University, Ithaca, N. Y., were the speakers.

The National Association of Industrial Teacher Trainers also held a meeting Wednesday morning at which F. Theodore Struck, Head, Department of Industrial Education, Pennsylvania State College, State College, Pa., was chairman, and the speakers were D. F. Jackey, Supervisor, Trade and Industrial Teacher Training, University of California, Los Angeles, Calif., and George E. Myers, Professor of Vocational Education, University of Michigan, Ann Arbor, Mich.

An industrial and part-time education session was held Thursday morning and the topic discussed was *Procedures in Measuring Accomplishment in Industrial Education*. O. B. Badger, Director, Industrial and Adult Education, Tulsa, Okla., was the chairman. Addresses were presented by Albert G. Packard, Supervisor Trades and Industries, Baltimore, Md.; H. A. Tiemann, Director, Vocational Education, San Diego, Calif.; R. B. McHenry, Director, Industrial Education, Fort Smith, Ark., John B. Coleman, Director, Vocational and Adult Schools, La Crosse, Wis.; J. W. Kelly, State Supervisor, Trade and Industrial Education, Olympia, Wash., and L. K. Covelle, State Supervisor, Trade and Industrial Education, Stillwater, Okla.

Another meeting held at the same time discussed the general topic *How to Bring About a Greater Diversity of Occupational Training as Part of the Trade and Industrial Education Service*. E. E. Gunn, Jr., Assistant State Director, Vocational and Adult Education, Madison, Wis., presided as chairman, and M. M. Hanson, Regional Agent for Federal Apprentice Committee, Washington, D. C.; Laurence Parker, State Supervisor, Trade and Industrial Education, Pittsburg, Kans.; C. A. Prosser, Director, William Hood Dunwoody Industrial Institute, Minneapolis, Minn.; N. B. Giles, Agent, Industrial Education, U. S. Office of Education, Washington, D. C., and George P. Hambrecht, State Director, Vocational and Adult Education, Madison, Wis., presented papers.

At the other Friday morning sessions of the Industrial-Education Section, under the chairmanship of Franklin J. Keller, Principal, Metropolitan Vocational High School, New York City, the general topic *To Develop Standards to Evaluate Trade and Industrial Programs Being Operated in States—Using the Industrial Education Sec-*

(Continued on page 16A)

A DETAIL OF THE COURT OF THE SEVEN SEAS, IN THE "WORLD'S FAIR OF THE WEST" TO BE HELD IN SAN FRANCISCO IN 1939

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HIGGINS

(Continued from page 15A)

tion of the A.V.A. as a Standardizing Agency, was discussed. A panel discussion was held at which O. R. LeBeau, Research Agent, American Vocational Association, Washington, D. C.; John A. McCarthy, Assistant Commissioner of Education, Trenton, N. J.; M. Norcross Stratton, Assistant Director, Division of Vocational Education, State House, Boston, Mass.; Gilbert G. Weaver, State Supervisor, Industrial Teacher Training, New York City; Milton Doerbaum, Personnel Manager, Century Electric Company, St. Louis, Mo., presented the discussion.

Another meeting held at the same time discussed the general topic *Methods of Obtaining Professional Improvement of the Personnel Affiliated with Industrial Education.* O. H. Day, Principal, Lathrop Polytechnic Institute, Kansas City, Mo., acted as chairman and papers were presented by H. A. Tiemann, Director, Vocational Education, San Diego, Calif.; M. Reed Bass, Director, David Ranken, Jr., School of Mechanical Trades, St. Louis, Mo.; R. W. Selvidge, Professor of Industrial Education, University of Missouri, Columbia, Mo., and Homer J. Smith, Professor, Industrial Education, University of Minnesota, Minneapolis, Minn. O. B. Badger, Director, Industrial and Adult Education, Tulsa, Okla., acted as discussion leader, and A. B. Mays, Professor of Industrial Education, University of Illinois, Urbana, Ill., presented a summary.

At the Friday afternoon session, E. K. Jenkins, Director of Vocational Education, Structural Clay Products Institute, Washington, D. C., acted as chairman. At this meeting, the general topic of *Relationships of Vocational School, Labor, and Industrial Management* was discussed. The following men were speakers: L. M. Raftery, Sixth General Vice-President, Brotherhood of Painters, Decorators and Paperhangers of America, St. Louis, Mo.; E. J. Flentje, Executive Secretary, National Association of Master Plumbers, Washington, D. C.; F. M. Karches, Director of Factory Personnel, The Emerson Electric Manufacturing Co., St. Louis, Mo.; and Daniel O. Collins, First Vice-President, Bricklayers, Masons and Plasterers International Union of America, Washington, D. C.

On Saturday, subsections in printing, metal trades, co-ordination, automotives, building trades, and public-service occupations were held.

Vocational-guidance meetings were held on Thursday morning, Friday morning and afternoon, and Saturday at which papers were presented by Harry D. Kitson, Professor of Education, Teachers College, Columbia University, New York City; C. E. Partch, Dean, School of Education, Rutgers University, New Brunswick, N. J.; Mary H. S. Hayes, Director of Guidance and Placement, National Youth Administration, Washington, D. C.; C. A. Prosser, Director, William Hood Dunwoody Industrial Institute, Minneapolis, Minn.; Willard E. Parker, Director Vocational Guidance Clinic, Washington University, and Personnel Officer, Farm Credit Administration, St. Louis, Mo.; Franklin J. Keller, Principal, Metropolitan Vocational High School, New York City; Harry A. Jager, Chief, Occupational Information and Vocational Guidance Service, U. S. Office of Education, Washington, D. C.; Fred C. Smith, Dean, University of Tennessee, Knoxville, Tenn.; Ralph E. Pickett, Assistant Dean of Education, New York University, New York City; Julian C. Aldrich, St. Louis County Guidance Council, St. Louis, Mo.; Ward N. Black, Assistant State Superintendent of Public Instruction, Springfield, Ill.; W. A. Ross, U. S. Office of Education, Washington, D. C.; George E. Hutcherson, Supervisor of Guidance, State Department of Education, Albany, N. Y.; Richard D. Allen, Assistant Superintendent of Schools, Providence, R. I., and Consultant, U. S. Office of Education, Washington, D. C.

At the Saturday luncheon held by the vocational-guidance group, Arthur K. Getman, A.V.A. Vice-President, representing Vocational Guidance, State Department of Education, Albany, N. Y., presided, and a panel discussion on the occupational adjustment of youth was held. The leader on this occasion was Lynn A. Emerson, Professor of Industrial Education, Cornell University, Ithaca, N. Y., and the members of the panel were: Paul W. Chapman, Dean, College of Agriculture, Athens, Ga.; John J. Seidel, State Director of Vocational Education, Baltimore, Md.; Mary H. S. Hayes, Director Guidance and Placement, National Youth Administration, Washington, D. C.; Howard Oxley, Director of Education, CCC, Washington, D. C.; Harold T. Smutz, U. S. Employment Service, St. Louis, Mo.; M. Reed Bass, David Ranken, Jr., School of Mechanical Trades, St. Louis, Mo.; George E. Hutcherson, Supervisor of Guidance, State Department of Education, Albany, N. Y.; Howard Cummings, Social Study Instructor, High School, Clayton, Mo., and Walter V. Bingham, Executive Director, Personnel Research Federation, New York City.

The vocational-rehabilitation section held a panel on Thursday at which the discussion centered on the topic of *The Co-operation of the Rehabilitation Service with the Elementary Schools.* The members of the panel were: W. H. Hartnett, Rehabilitation Agent, St. Louis, Mo.; Claude Stephens, Principal, Elias Michael School, St. Louis, Mo.; Everett J. Colbert, Principal, Turner School for Crippled Colored Children, St. Louis, Mo.; John Grace, Gallaudet School, St. Louis, Mo.

Friday morning the discussion centered on the topic *How Co-operation is Developed Between the Public Schools and the Rehabilitation Service.* The speakers on this occasion were Paul M. Kinder, Assistant Supervisor, Vocational Rehabilitation, Jefferson City, Mo., and Clifford Chewning, Supervisor, Kansas City, Mo.

The annual banquet which was held Thursday at 6:30 p.m., registered a record-breaking attendance.

Ralph McGill, Editor of the *Atlanta Constitution,* Atlanta, Ga., spoke on *The Newspaper Man Looks at Vocational Education for Our Rural Boys and Girls.* He emphasized that the South is the No. 1 economic problem of our country in spite of the fact that it has huge forests and untold wealth in coal, iron, oil, and cotton. The North buys this raw material from the South and turns it into finished articles, thus leaving

(Continued on page 18A)

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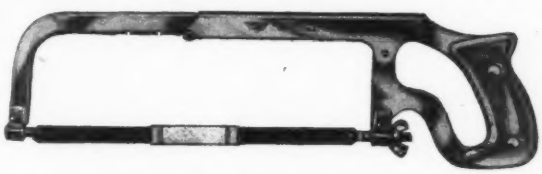

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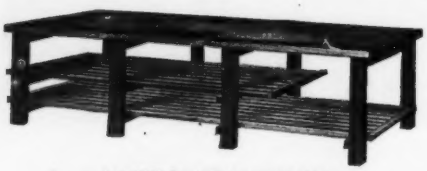

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LEPAGE'S ADHESIVES
Department A
GLOUCESTER, MASS.

(Continued from page 16A)

no value or wages for the South. In spite of the fact that Georgia has the oldest chartered state university, there were hardly a dozen accredited high schools in the South up to thirty years ago. This means that little education and much illiteracy and poverty are to be found in that part of our country. Vocational education can change this by bringing the underprivileged to a higher plane.

George L. Googe, Representative of the American Federation of Labor, Member of the President's Advisory Committee on Education, and Delegate to the International Labor Conference on Technical and Vocational Education and Apprenticeship, spoke on *Labor Looks Ahead in Vocational Education.* He pointed out that labor has always been interested in vocational education, and that to make vocational education effective, both labor and the reputable employers, together with educators, must co-operate to make vocational education effective.

As usual, the Ship's anniversary program Friday evening at 9 o'clock was a huge success and thoroughly enjoyed by all present.

The newly elected officers for the coming year are: President, A. S. Boynton, Hartford, Conn.; vice-president, James R. D. Eddy, Austin, Tex.; secretary-treasurer, Ralph H. Woods, Frankfort, Ky. Members of the Executive Committee are: C. A. Fulmer, Lincoln, Nebr.; Paul Cressman, Harrisburg, Pa.; Anthony E. Karnes, Juneau, Alaska; George Fern, Lansing, Mich. (retiring president).

The next meeting will be held at Grand Rapids, Mich.

♦ The Wisconsin Industrial Arts Association held its annual meeting at Milwaukee, at 2 p.m., Thursday, November 3, 1938. Leo R. Ebben, Kohler, Wis., presided. Clyde A. Bowman, Dean of the School of Industrial Education, Stout Institute, Menomonie, reported for the curriculum committee. This committee is to be highly complimented on the excellent 104-page bulletin entitled "Teaching Industrial Arts in Wisconsin Schools" which they prepared for this year's distribution among the members of the Association. In spite of the excellency of this bulletin, Dean Bowman modestly called it "a mere progress report."

Frank C. Moore, Director Industrial Arts, Cleveland, Ohio, was the main speaker. His subject was "Trends in Industrial Arts."

The new officers for the year 1939 are: President, Tom Hippaka, Madison; vice-president, George Guenther, Wausau; secretary-treasurer, Roy Van Duzee, West Allis; committeeman-at-large, R. R. Bedker, Wauwatosa; curriculum-committee chairman, Clyde Bowman, Menomonie; state department representative, Frank Powell, Madison.

The following industrial-arts group meetings were held on Friday afternoon, at 2 o'clock: *General drafting,* chairman, R. R. Bedker Wauwatosa; *general electricity,* chairman, W. A. Sherman, Eau Claire; *industrial arts and vocational printing,* chairman, Duane Brophy, Milwaukee; *the one-man industrial-arts department,* chairman, H. C. Rose, West Allis; *general metal,* chairman, Paul E. Tormey, New Holstein; *industrial mechanics,* chairman, H. F. Good, Menomonie; *general woodwork,* chairman, George Dally, Milwaukee.

At the recent meeting of the Industrial Arts East Tennessee Education Association, held October 27–29, 1938, in Knoxville, Tenn., the Industrial-Arts Group and the Vocational Trade and Industry Group held separate meetings.

At the Industrial-Arts Group meeting, held Friday, October 28, at which J. M. DeLozier, Johnson City, was the chairman, the following addresses were given at the morning session: *How the Industrial Arts Serve the Objectives of General Education,* W. R. Baker, Department of Industrial Education, State Teachers College, Johnson City; *Organization of Subject Matter,* Dr. R. W. Selvidge, Professor Industrial Education, University of Missouri, Columbia, Mo.

The following addresses were given at the afternoon session: *Socialized Industrial Arts,* Dr. S. E. Torsten Lund, Professor of Secondary Education, University of Tennessee; *How the Art Crafts Can Enrich the Industrial Arts,* Dr. Frank A. Staples, National Recreational Association, New York City.

The round-table discussion on *Problems of the Industrial-Arts Teachers* was led by Charles J. Anderson, Central High School, Chattanooga. There were also five-minute discussions on the following topics, with questions by the Group: *Use of Textbooks and Job Sheets,* Bob Wharton, Chattanooga; *The Industrial-Arts Teacher and Vocational Guidance,* Hugh J. Betts, Knoxville; *Production and Repair Work,* Fred Clark, Chattanooga; *Methods of Grading,* Elmer Aslinger, Knoxville.

The Vocational Trade and Industry Group also held its meeting on Friday. Thomas Bell, Chattanooga Technical High School, was the chairman. The following addresses were given at the morning session: *Securing Community Support for a Vocational Program,* Edmund Armstrong, Instructor General Building Trades, Wartburg; *How to Organize Classes for Effective Work,* Alvin Jackson, Instructor General Building Trades, Crossville; *What an Industrial Plant Seeks in Selecting Employees,* W. A. Long, Assistant Superintendent, Holston Manufacturing Corporation, Knoxville; *Helpful Teaching Aids for Related Subjects,* Charles P. Parsons, Vocational and Technical High School, Chattanooga. There was also a round-table discussion led by Clyde H. Wilson, Professor of Industrial Education, University of Tennessee.

At the afternoon session, the following addresses were given: *New Developments in the Trades,* G. J. Hardy, Supervisor Vocational Education, Knoxville; *Problems Involved in Selection and Placement of Students in a Co-operative Program in Diversified Occupations,* S. B. Keathley, Co-ordinator Diversified Occupations, Maryville; *Efficiency Factors in a Successful Evening Trade Extension Program,* I. L. Garner, Itinerant Instructor in Mining, La Follette; *The Use of*

(Continued on page 20A)

THE 1939

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(Continued from page 18A)

Instruction Sheets in Trade Teaching, Dr. R. W. Selvidge, Professor Industrial Education, University of Missouri.

There was also a round-table discussion led by W. A. Seeley, State Supervisor of Trade and Industrial Education, Nashville.

The following officers were elected for 1939: Chairman, James Milburn; vice-chairman, S. M. Bergin; secretary, James Mooney.

♦ On November 5 the national honorary fraternity for men in the field of Industrial Arts installed the 19th chapter in the State Teachers College at Buffalo, N. Y. Mr. Irving C. Perkins and Mr. George C. Decker cosponsoring the local chapter. This is one of three chapters installed during the past six months and will be designated as Tau Chapter of Epsilon Pi Tau. It is the first chapter to be installed in New York State.

The formal installation and initiating ceremonies were held in the afternoon with Dr. William E. Warner of Ohio State University acting in his official capacity as National Secretary. Others who assisted him in the program included the following: Professor Orville E. Sink, Chairman, Industrial-Arts Department, Ball State Teachers College, Muncie, Ind.; Dr. Lawrence F. Ashley, Chief of Division of Vocational Education, Board of Education, Yonkers, N. Y.; Professor George H. Spearman, State College, San Jose, Calif.; Professor E. B. MacLean, State Teachers College, Fitchburg, Mass.; Professor John J. Hatch, State Teachers College, Newark, N. J.; Mr. J. Knapp Boddiford, Sylvania, Ga.; and Professor Secundino Vega, University of Porto Rico, Rio Piedras, Porto Rico.

Members of the initiating team, including undergraduate group from the Fitchburg State Teachers College. Front row, left to right: Decker, Mitchell, Matyosaites, Lambert, Baker, Cutler, Perkins. Back row, left to right: Boddiford, MacLean, Ashley, Sink, Warner, Spearman, Hatch, Vega, Osburn

A feature of the afternoon installation was the work of the Ritual Demonstration Team, undergraduates of Epsilon Chapter, from the Fitchburg State Teachers College, Fitchburg, Mass.

Following the formal installation a banquet was held at the Hotel Touraine, Buffalo, N. Y.

Mr. Irving C. Perkins from the Buffalo State Teachers College acted as toastmaster and Dr. Warner conducted a stimulating symposium on the newer contributions of industrial arts to the field of education. This was followed by a very fine presentation of the charter by Professor Burl N. Osburn of the State Teachers College, Millersville, Pa.

♦ The regular monthly meeting of the School Crafts Club was held at the West Side Y.M.C.A. Building, New York City, on Saturday, November 19. Garson Goldberg acted as chairman.

After the regular business meeting, Fred O. Armstrong of the State Teachers College, Trenton, N. J., gave a very interesting and useful demonstration and lecture on "Chemistry in the School Shop." Mr. Armstrong demonstrated how to make various types of glues, stains used in woodworking, soldering, fluxes, etc., that are used in the school shop at a very nominal cost.

George W. Watson, Basking Ridge, N. J., conducted a round-table discussion "Shop Projects for the Ninth Grade." Mr. Watson had several projects made in his classes out of iron, copper, and pewter which he used in his lecture.

The next regular meeting will be held at the same address on Saturday, January 21, 1939.—*Garson Goldberg.*

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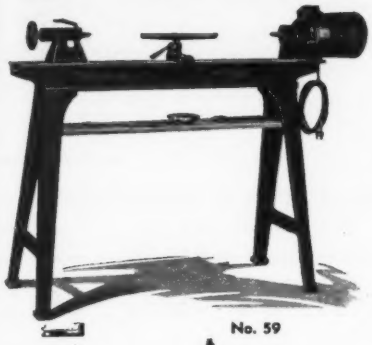

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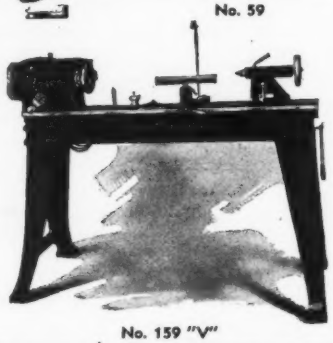

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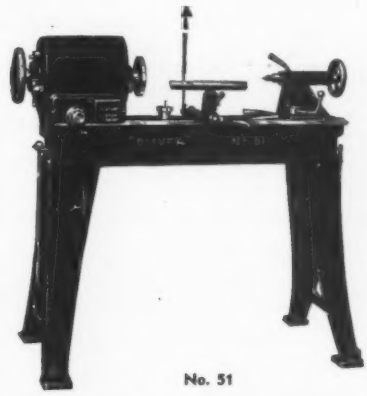

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ciation meeting will be held on February 10, 1939, at Tulsa, Okla. H. F. Rusch, Central High School, Oklahoma City, Okla., is the secretary.

♦ The National Vocational Guidance Association meeting will be held February 22–24, at Cleveland, Ohio. Dr. Fred C. Smith, Dean University of Tennessee, Knoxville, Tenn., is the secretary.

♦ The Ohio Vocational Association will hold its meeting December 27, 1938, at Columbus, Ohio. Elizabeth M. Moore, Campbell Hall, Ohio State University, Columbus, Ohio, is the secretary.

♦ The Massachusetts Industrial Education meeting will be held January 14, 1939, at Boston, Mass. Daniel J. Sullivan, 135 Perham St., West Roxbury, Mass., is the secretary.

♦ The Future Craftsmen of America National Convention will be held in Detroit, Mich., May 4, 5, and 6, 1939. Various contests will be held, including automobile starting, mechanical drafting, public speaking, machine-shop work, woodwork, welding, and others. Information on these contests or details concerning the Future Craftsmen of American Organization may be obtained from the Future Craftsmen of America National Headquarters, 1005 Stroh Building, Detroit, Mich.

News Notes

♦ The International Drawing Exchange has this year rounded out the ninth year of its existence. Mr. Walter G. Hjerstedt, Instructor of Mechanical Drawing, Roosevelt Senior High School, Chicago, Ill., founded this Exchange in the hope that students of mechanical drawing in many nations would have friendships with each other which would endure into later life and exert a benevolent influence.

After the objectives of the Exchange had been established, letters were sent to all American consuls and ambassadors in foreign countries asking for their co-operation in an international exchange of drawings and ideas. In practically all countries of the world, the International Drawing Exchange has been in direct communication with government officials and educators, and at the present time includes between five and six thousand drawings from twenty-three foreign countries.

Mr. Hjerstedt was an industrial draftsman before he became a teacher in the Chicago schools. He has taught mathematics, science, machine design, architecture, and freehand and mechanical drawing.

♦ Miss May K. Smith, probably the only full-time high-school woman teacher of architectural and mechanical drawing, has organized the drawing classes in Monroe, Mich., somewhat along the lines suggested in General Mechanical Drawing issued last year by the M.I.E.S., of which she is a charter member. Miss Smith, who graduated from Michigan State Normal College at Ypsilanti in 1907 and introduced the teaching of manual training in Monroe High School the same year, took one summer of advanced mechanical drawing at Teachers College, Columbia University.

♦ Construction of two additional shops to the Midland, Mich., new high school began October 20. This expansion includes a woodshop and a general metal shop in addition to the hand tools for benchwork. The general metal shop will be equipped for work in auto mechanics, sheet metal, forging, electricity, foundry practice, and welding. Power machinery will be installed in the woodshop in addition to the hand tools for benchwork. At the present time, the industrial-arts department includes a mechanical-drawing room and a general metals shop, the latter to become a straight machine shop next year.

♦ The much-needed West Side Trade School in Detroit, Mich., will be opened in the Munger Intermediate School with the beginning of the new term in February. The school will follow the plan of the George Trade School so far as facilities will permit.

♦ The Madison, Wis., board of education recently awarded a contract for an addition to the industrial-arts unit at the East High School, Madison. The addition will cost $85,000, which does not include equipment.

A very comprehensive program of industrial arts is being planned for the three new elementary schools which Madison is going to build. The total cost of these schools will be $1,500,000.

♦ The annual meeting of the Detroit Public Schools' Model Yacht Committee was held during the past month at the McMichael School. New officers for the year were elected: Chairman, Earl Phillips, Tappan; secretary-treasurer, Lester Hines, Condon.

♦ An evening class for pipe-line and oil-field men has been established in the high school at Paola, Kans. A large number of students have enrolled for the work.

♦ A variety of subjects is being offered in the evening classes in Wichita, Kans., among which are show-card writing, machine-shop practice, airplane welding, refrigeration, printing for apprentices, steel square, theory of electricity, and safe driving.

New Products

THE WALLACE NO. 28 HY-GEAR SHAPER completely satisfies the need for a powerful super-speed shaper. Geared up to a spindle speed of 10,000 r.p.m., with single-phase or three-phase motor, this shaper operates on standard 60-cycle a.c. circuits, affording constant high speed without frequency changers.

It has a ¾-in. diameter removable spindle, carrying knives up to 2½ in. wide, solid cutters 2¾ in. wide, diameters up to 3½ in. With spindle dismounted, a chuck is available taking cutters and router bits down to ¼ in. in diameter. Forty-one standard shapes of knives and cutters can be furnished at extremely low prices, and any special knives or cutters can be made to order on short

(Continued on page 22A)

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(Continued from page 21A)

notice. These tungsten chromium-alloy steel knives and cutters are made especially for shaper-cutter service and are self-hardening, so if the cutting edges are burned, they will not lose their temper.

Separable spindles and numerous convenient attachments afford fast changes which save setup time. Fences and gauges are available for easy attachment and operation of jigs and fixtures on production work.

Standard equipment in the Wallace No. 28 Hy-Gear Shaper are the built-in geared motor-drive unit with reversing switch, cord and plug, two grooved shaper collars, four spacing collars, locking pin, disk guard, and wrenches.

Further information on this machine may be obtained from the J. D. Wallace and Company, 134 S. California Ave., Chicago, Ill.

THE ADJUSTABLE CLAMP COMPANY, 424 N. Ashland Ave., Chicago, Ill., call attention to the improvements in their famous "Pony" steel bar clamp fixtures. The changes are slight, but increase the facility and ease of adjustment of the clamp jaw.

The genuine "Pony" fixtures have always been characterized by an unfailing grip and with power equal to the strength of the pipe on which they are used without crushing or deforming the pipe, with long life and minimum replacement or repair costs. Clamps of any desired maximum capacity can be made by simply screwing the head on to the standard pipe threads at one end of any pipe and slipping the other clamp jaw over the other end of the pipe. No tools are required to put together or to take apart, as no holes or notches are required in the pipe.

The Adjustable Clamp Company will be glad to send a set of fixtures of the new type on a memo invoice so that its improvements over the older models can be proved in service.

CHAS. M. HIGGINS & CO., INC., have announced the production of the Higgins Photo Sketch Outfit which permits anyone to make pen and ink drawings from photographs.

Based on all the old, tried processes of silver printing, this method has been made conveniently available to anyone interested in either photography or drawing. The process is extremely simple. Anyone who can write, can take a pen and with Higgins Waterproof Ink, go over the outline of the drawing, fill in the shadows of the photograph and then, with a simple solution of chemicals supplied in the outfit, bleach out the photograph, leaving the pen-and-ink drawing intact.

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THE STANLEY RULE AND LEVEL PLANT, New Britain Conn., are offering shop instructors the

(Continued on page 25A)

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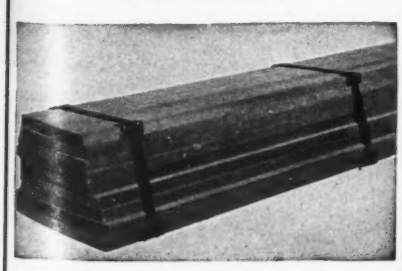
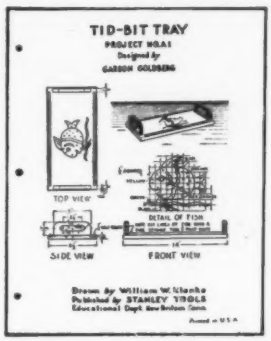


(Continued from page 22A)

new Stanley Plan Packet for 50 cents per copy. It contains plans for 26 projects, suitable for elementary- and junior-high-school shop use.

All the plans were submitted by shop instructors in schools as part of a contest to obtain project plans that were good in design and suited to school use. The 26 plans included in the Packet were the winners in the contest. Each plan has been redrawn and printed on an 8½



by 11-in. sheet of tough paper, punched for a 3-ring binder. The price at which the Plan Packet is offered covers only the cost of printing and postage.

New Trade Catalogs

THE HAMILTON MFG. COMPANY, Two Rivers, Wis., announce the 1939 edition of their catalog. The new Steelwood industrial-arts benches, Steelwood drawing tables, and other industrial-arts department furniture, are completely described and illustrated in this 192-page book.

The Hamilton Mfg. Company will gladly furnish a copy of this catalog to school-shop instructors upon request.

THE KUEMPEL CHIME CLOCK CO., Guttenberg, Iowa, offer to school-shop instructors their latest catalog containing prices and drawing plans for their clock movements and cases.

Trade News

HARVEY L. RAMSAY has been appointed Sales Promotion Manager for the Porter-Cable Machine Company of Syracuse, N. Y., manufacturers of industrial sanding machines, floor sanders, electric hand saws. Mr. Ramsay was for a number of years sales manager of J. D. Wallace and Company, Chicago, Ill.

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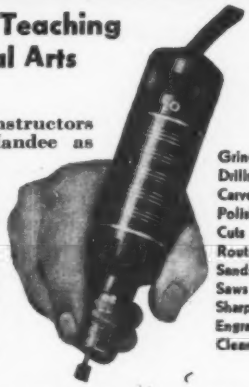

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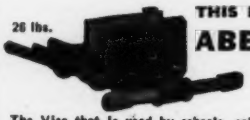

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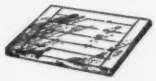

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